



***SMALL ENTITY COMPLIANCE GUIDE
FOR THE
REVISED RESPIRATORY PROTECTION STANDARD***

**PREPARED FOR:
U.S. DEPARTMENT OF LABOR
DIRECTORATE OF HEALTH STANDARDS PROGRAMS
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
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SMALL ENTITY COMPLIANCE GUIDE
for the

REVISED RESPIRATORY PROTECTION STANDARD

FINAL DRAFT

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INTRODUCTION

This guide is intended to help small businesses comply with the Respiratory Protection standard. It provides guidance only, and does not alter or determine compliance responsibilities, which are set forth in Occupational Safety and Health Administration (OSHA) standards and the Occupational Safety and Health Act. The guide does not replace the official Respiratory Protection standard (29 CFR 1910.134), which is contained in Appendix I of this document. The reader must refer to the standard to ensure compliance. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts.

The Respiratory Protection standard will protect an estimated 5 million respirator wearers working in 1.3 million workplaces. OSHA estimates that compliance with the standard will prevent hundreds of deaths and thousands of illnesses in U.S. workplaces each year.

The Respiratory Protection standard specifies only the minimum requirements for an effective respiratory protection program. You are encouraged to exceed these minimum criteria if doing so enhances the safety and health of your employees.

In 21 states and two territories, occupational respiratory requirements are enforced by the state agency responsible for the OSHA-approved state plan. These states are: Alaska, Arizona, California, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington and Wyoming. New York and Connecticut also operate OSHA-approved state plans limited in scope to state and local government employees.

State plans are required to adopt and enforce respiratory protection standards that are either identical to or at least as effective as the federal standard. These states are also required to extend the coverage of their respiratory protection standard to state and local government employees, including paid, and in some states, volunteer, firefighters, who are otherwise not covered by the federal standard. The information in this guide should be equally applicable to you if you are located in a state plan state, although you should check to see if there are any unique or additional requirements that may apply. (A list of phone numbers and addresses for the state programs is included in Appendix II.)

Who should read this guide?

You should read this guide if it is likely that you will need to establish and implement a respiratory protection program for your business. Under the Respiratory Protection standard, OSHA may require you to establish a respiratory protection program when exposure to an airborne contaminant or to low oxygen levels can cause illness or injury to a worker's health, and when these health effects can be prevented by the appropriate

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selection and use of a respirator.

How do I use this guide?

The guide is divided into chapters that correspond to the major provisions, or paragraphs, of the Respiratory Protection standard (e.g. respirator selection—paragraph (d), fit testing—paragraph (f)). Each chapter follows the same organization as the corresponding paragraph of the standard, providing more detail than the standard itself to help you better understand the requirements. Standard citations (e.g. (d)(3)(ii)) are provided in the margins to enable you to refer from the explanations provided in this guide to the original standard, which is included in Appendix I. Checklists are provided at the end of each chapter.

In addition, Appendix III of this document contains *Questions and Answers on the Respiratory Protection standard (Q&A)*. If you do not find the answers to your particular questions in this document, check the *Q&A*.

Appendix IV of this guide contains a sample respiratory protection program. This sample program was written for a hypothetical company to provide an example of how the requirements of the Respiratory Protection standard may be appropriately implemented. Keep in mind that there is often more than one way to implement certain requirements of the standard in a particular workplace setting.

What is a respirator?

Respirators are devices that protect workers from inhaling harmful substances. These substances can be in the form of airborne vapors, gases, dust, fogs, fumes, mists, smokes, or sprays. Some respirators also ensure that workers do not breathe air that contains dangerously low levels of oxygen.

There are two major types of respirators:

1. Air-purifying respirators, which remove contaminants from the air.
2. Atmosphere-supplying respirators, which provide clean air from an uncontaminated source.

Respirators provide protection from respiratory hazards only when they are used properly.

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Atmosphere supplying respirator



Air-purifying respirator

What is a respiratory protection program?

A respiratory protection program is a cohesive collection of worksite-specific procedures and policies that addresses all respiratory protection elements required by the standard. For example, a respiratory protection program must contain specific procedures describing how respirators will be selected, fitted, used, maintained and inspected in a particular workplace. Chapter (c) of this guide contains more information on respiratory protection programs.

When am I required to establish a respiratory protection program?

Generally, whenever you or OSHA requires your employees to wear respirators. For example, you may need to establish a respiratory protection program:

- # If your employees work in situations where the level of oxygen is insufficient, or potentially insufficient.
- # If your employees are potentially exposed to harmful levels of hazardous gases or vapors.
- # If your employees are exposed to other potential respiratory hazards, such as dust, mists, fumes, sprays, and other airborne particles.

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You need to supply workers with respirators when all preferred methods of protecting them from breathing contaminated air have been determined to be insufficient to reduce the contamination to nonhazardous levels. You must consider the potential for emergencies when making this determination. These preferred methods include:

- # Engineering controls, such as ventilation.
- # Substituting non-hazardous materials for the materials that pose respiratory hazards.
- # Administrative controls, such as scheduling major maintenance for weekends or times when few workers are present.

If you have any questions about when to supply your employees with respirators, refer to the standard in Appendix I.

What is OSHA's Respiratory Protection standard?

The Respiratory Protection standard requires employers to establish and maintain a respiratory protection program to protect their respirator-wearing workers. OSHA has issued a revised standard, which became effective on October 5, 1998. It updates and replaces a standard that OSHA adopted in 1971. (The complete text of the revised standard is included in Appendix I.)

The revised standard incorporates new scientific principles and technologies that have emerged since 1971. Because of advances in technology, many areas covered by the previous standard had become outdated.

The new standard is intended to:

- # Enhance the protection of worker health.
- # Promote more effective use of respirators.
- # Make it easier for you to comply with its provisions.
- # Make it easier to understand the policy and procedures you must follow when implementing a respiratory protection program.

How does the new standard differ from the old standard that it replaces?

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The new standard:

- # Contains new provisions that recognize the needs of small businesses.
- # Requires written respiratory protection programs to include work-site specific procedures. *(See Section (c) of this guide.)*
- # Requires that a qualified "program administrator" oversee the respiratory protection program. *(See page c-5 of this guide.)*
- # Provides:
 - Definitions that will eliminate confusion about terminology and how these terms apply to respirators and their use. *(See Section (b) of the standard in Appendix I.)*
 - Criteria for selecting respirators. *(See Section (d) of this guide.)*
 - Clear language on the requirement for medical examinations of workers and the use of medical questionnaires. *(See Section (e) of this guide.)*
- # Requires employers to perform a hazard determination to identify respiratory hazards and work conditions. *(See pages d-1 through d-4 of this guide.)*
- # Requires annual fit testing for all tight-fitting respirators, and it includes protocols for fit testing. *(See Section (f) of this guide and Appendix B of the standard in Appendix I of this guide.)*
- # Addresses the use of respirators in situations that OSHA characterizes as Immediately Dangerous to Life or Health (IDLH). *(See page g-6 of this guide.)*

How does the new Respiratory Protection standard recognize the needs of small businesses?

Among other things, the revised Respiratory Protection standard:

- # Allows the use of a medical questionnaire to screen for employee health conditions which could effect their ability to use a respirator. The questionnaire must be administered by a physician or other licensed health care professional. *(See page e-2 of this guide.)*

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- # Allows medical evaluations to be conducted either by a physician or by another licensed health care professional. (*See page e-2 of this guide.*)
- # Requires medical evaluations after the initial evaluation to be conducted only when specific conditions indicate a need for a reevaluation. (*See page e-3 of this guide.*)
- # Minimizes the amount of paperwork required in connection with medical evaluations. (*See pages e-5 through e-7 of this guide.*)
- # Establishes flexible requirements for cleaning and disinfecting respirators issued to individual employees “as necessary to be maintained in a sanitary condition.” (*See page h-1 of this guide.*)
- # Allows tags be used to document respirator inspections rather than written records. (*See page h-3 of this guide.*)
- # Allows you to obtain a certificate of breathing gas analysis from the supplier instead of requiring you to conduct your own gas analysis. (*See page i-2 of this guide.*)

Whom can I contact if I have additional questions about the Respiratory Protection standard that are not answered in the Small Entity Compliance Guide?

For additional assistance in establishing and implementing a respiratory protection program, contact the OSHA Area Office nearest you. If you are unable to contact your local OSHA Area Office, you can contact the appropriate OSHA Regional Office for information or assistance. A list of OSHA Area and Regional Offices is included as Appendix II.

The OSHA Consultation Service is an excellent resource for additional assistance. This free program helps employers find out about potential hazards and improve their occupational safety and health management systems. It is separate from the OSHA inspection effort. State OSHA Consultation programs are listed in Appendix II.

If you are located in a state that operates an OSHA-approved State Plan, you should contact the responsible state agency listed in Appendix II for information and assistance.

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Section (a): PERMISSIBLE PRACTICE

(a)(1) ENGINEERING CONTROLS

To prevent illness or diseases caused by breathing hazardous air in the workplace, you must use engineering controls to the extent feasible to prevent contamination of the workplace atmosphere. When engineering controls are not feasible, or while engineering controls are being put in place, appropriate respirators must be used.

How do I know if the atmosphere in my workplace is hazardous?

An atmosphere is hazardous if it does not contain sufficient oxygen, or if it contains chemical, biological, or radiological contaminants in sufficient quantity to harm the health of employees. Section (d) of this guide contains information on how to identify and evaluate respiratory hazards in your workplace.

What are engineering controls?

Engineering controls physically change the work environment to reduce employee exposure to air contaminants. Such controls may include:

- # Change of the work process
- # Substitution of less hazardous substances for harmful materials
- # Isolation or enclosure of the work process or of employees
- # Local exhaust or general dilution ventilation

Where can I find guidance on the type of engineering controls I may need to put in place?

Potential sources for this type of information include:

- # Trade associations.
- # Manufacturers or suppliers of materials or equipment associated with the creation

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of air contaminants.

- # Your insurance carrier.
- # Government agencies (see Appendix II of this guide for a list of OSHA offices in your area).
- # OSHA Consultation Program (see Appendix II of this guide for the list of States with consultation programs).
- # Industrial hygiene consultants.

(a)(2) PROVIDING YOUR EMPLOYEES WITH RESPIRATORS

You must provide respirators when such equipment is necessary to protect the health of employees. The respirator provided must be suitable for its intended purpose. When you are required to provide respirators, you must establish and maintain a respiratory protection program. The requirements for a respiratory protection program are described in Section (c) of this guide.

How do I know if the engineering controls I install are sufficient to protect employee health?

The vendor who supplies your engineering controls may be able to help you determine whether the controls will adequately protect your employees from respiratory hazards. You can also evaluate the level of contamination in your workplace after the engineering controls are installed, as explained in Section (d) of this document.

How do I know what type of respirator is suitable for protecting the health of my employees?

Section (d) of this guide will answer your questions about selecting a suitable respirator.

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Is worker rotation acceptable as an interim control while engineering control measures are being developed and implemented?

Rotation is an acceptable practice for less-toxic contaminants. It is never permitted for protection against cancer-causing substances. In addition, many of OSHA's substance-specific health standards contain ceiling limits that do not allow the use of worker rotation. If respirators are also necessary to protect the health of the employee while engineering controls are being developed, they must be provided.

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Section (b): DEFINITIONS

This section of the Respiratory Protection standard contains definitions of important terms used in the text of the standard. The definitions are intended to clarify the requirements of the standard. They are contained in Paragraph (b) of the standard, which is included as Appendix I of this guide.

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Section (c): RESPIRATORY PROTECTION PROGRAM

Whenever respirator use is required by you or by OSHA, this section of the Respiratory Protection standard dictates that you:

- # Develop a written respiratory protection program with procedures that are specific to your worksite.
- # Implement the program and update it as necessary.
- # Assign a qualified program administrator to run and evaluate the program.

Additionally, you are required to ensure that certain aspects of the respiratory protection program are followed by employees who wear a respirator voluntarily (that is, they wear respirators even though respirator use is not required by either you or OSHA).

(c)(1) PROGRAM DEVELOPMENT AND IMPLEMENTATION

You are required to develop and implement a written respiratory protection program and to update it as necessary.

Program Development

You must develop a written respiratory protection program that includes procedures for the use of respirators in any work areas where protection from respiratory hazards is required. The procedures in your program must be specific to your particular workplace.

All required elements of the respiratory protection program must be in writing unless a particular element does not apply to your workplace. For example, if you do not use atmosphere-supplying respirators, then you do not need to develop procedures for that type of respirator.

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Why a written program?

A written program is needed because health and safety programs can be more effectively implemented and evaluated if the procedures are available in a written form for study and review.

Also, a written respiratory protection program is the best way to ensure that the unique characteristics of the worksite are taken into account. Developing the written program encourages you to thoroughly assess and document information pertaining to respiratory hazards posed to your employees—both during normal operating conditions and during reasonably foreseeable emergencies.

Program Content

You are required to include the following elements (as applicable) in your respiratory protection program:

- # Procedures for
 - Selecting appropriate respirators for use in the workplace.
 - Fit testing tight-fitting respirators.
 - Using respirators properly in routine situations as well as in reasonably foreseeable emergencies.
 - Cleaning, disinfecting, storing, inspecting, repairing, removing from service or discarding, and otherwise maintaining respirators. Also, you must establish schedules for these elements.
 - Ensuring adequate air supply, quantity, and flow of breathing air for atmosphere-supplying respirators.
 - Regularly evaluating the effectiveness of the program.
- # Provisions for medical evaluation of employees who must use respirators.
- # Training employees in the proper use of respirators (including putting them on and removing them), the limitations on their use, and their maintenance.

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Appendix III, Sample Respiratory Protection Program, provides additional guidance on the required content of the respiratory protection program.

Program Implementation and Updating

Once you have established a written program covering all the required elements that apply to your workplace, you then must ensure that the program is appropriately implemented. Implementation of the program must be administered and overseen by your program administrator (see section (c)(3)).

Once your program has been implemented you must ensure that it is updated *as necessary* to reflect relevant changes in the workplace. That is, you need to revise only the elements of the program that have been affected by changes that relate to respiratory hazards in work areas. For example, you would need to revise the appropriate sections of your written program if new processes or new chemicals were introduced into the workplace that will impact respirator usage. In addition, if you make any changes in the types of respirators used or in any of the other elements of the respiratory protection program, you must make appropriate revisions to the written program.

(c)(2) VOLUNTARY RESPIRATOR USE

You are required to ensure that all employees who use a respirator voluntarily are provided with certain basic information on proper use. Additionally, you must ensure that certain of these workers are included in your program's provisions for medical evaluations, and for cleaning, storage, and maintenance of respirators.

What is meant by "voluntary" use of respirator equipment?

Voluntary use is when an employee chooses to wear a respirator, even though the use of a respirator is not required by either you or by any OSHA standard.

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Providing Basic Information to Voluntary Respirator Users

You may allow an employee to use a respirator voluntarily, if you determine that the respirator itself will not present a hazard to the employee due to misuse, other hazards or conditions in the workplace, or employee medical conditions. In such cases, you may provide employees with respirators or allow them to use their own respiratory protection.

If you allow such use of a respirator, you must provide the voluntary respirator user with the advisory information in Appendix D of the standard (see Appendix I in this document). This appendix provides basic information on the proper use of respirators for employees who are voluntary users of the equipment and thus are not required to undergo training. These precautions can be presented to the employee either verbally or in a written form. (See also Section (k) of this guide on Training and Information.)

Applicable Components of the Respiratory Protection Program

You must ensure that certain aspects of your respiratory protection program are implemented for voluntary respirator users. This requirement, however, does not apply for employees who voluntarily wear dust masks (filtering facepieces).



Filtering facepieces

Elements of the program that apply to voluntary users (except those using filtering facepieces (dust masks) voluntarily) involve:

- # Provisions for medical evaluation of employees who use elastomeric respirators.
- # Procedures for cleaning, disinfecting, storing, inspecting, repairing, removing from service or discarding, and otherwise maintaining respirators. Also, you must establish schedules for these program elements.

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Implementing these aspects of the program for a voluntary respirator user will ensure that the respirator is used properly and does not create a hazard to the user. If these provisions are not implemented, potential hazards or problems could result:

- # A respirator wearer's health could be jeopardized due to an undetected medical condition (e.g., asthma, heart condition).
- # A dirty respirator could cause dermatitis.
- # A dirty or poorly disinfected respirator could cause an ingestion hazard.

What types of respirators do the voluntary use requirements apply to?

This requirement applies primarily to tight-fitting negative pressure APRs, and it would also apply to powered APRs if an employee elected to voluntarily use this type of respirator. It does not apply to dust masks (filtering facepieces).

Do I need to have a written respiratory protection program if only voluntary users wear respirators at my facility?

No, if the only respirators being worn voluntarily are filtering facepieces (dust masks). Yes, if APRs or powered APRs are being used voluntarily. But when this is the case, your written program needs to include only the elements that pertain to voluntary users: a section on medical evaluations, and one on inspection, care, and maintenance.

(c)(3) PROGRAM ADMINISTRATOR

You must designate a program administrator to run the program and evaluate its effectiveness. An individual is qualified to be a program administrator if he or she has appropriate training or experience in accord with the program's level of complexity.

This training or experience is appropriate if it enables the program administrator to fulfill the minimum standard requirements of recognizing, evaluating, and controlling the hazards in your workplace. For example, if your program requires air-supplying respirators for use in immediately dangerous to life or health (IDLH) environments, your program administrator must have training

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and experience pertaining to the use of this type of equipment. Similarly, if you don't use air-supplying respirators and don't have significant respiratory hazards at your workplace, someone with less sophisticated experience or training might be able to effectively serve in this position.

Ultimately, the appropriate qualifications for your program administrator must be determined based on the particular respiratory hazards that exist, or that are reasonably anticipated, at your workplace.

How do I, or a designated employee, become a qualified program administrator?

If your workers are exposed only to nuisance dusts and relatively low-toxicity materials, and they use only a few types of relatively simple respirators, knowledge of this guide and materials supplied by the manufacturer may be sufficient for you, or a designated employee, to serve as the program administrator.

If more dangerous chemicals are present, if the potential for high exposures exists, or if sophisticated respirators are used, the program administrator must have more extensive experience and/or training. In these circumstances, you may need to seek out the expertise needed or obtain appropriate training.

Is there a list of approved training courses I can send my program administrator to?

No. OSHA does not provide a training course specifically to train respiratory protection program administrators, nor does OSHA require program administrators to attend a specified course. OSHA only requires the program administrator to have an adequate level of training or experience to deal with the complexity of the respiratory protection program at the worksite.

You may want to check with trade associations or adult education programs run by universities or technical and vocational schools in your area. The OSHA Consultation Program can help you identify appropriate training courses, or, if you hire a consultant to help you with aspects of your respiratory protection program, he or she may be able to help you with this.

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How will OSHA determine that a person is experienced and/or trained to be a respiratory protection program administrator?

Usually, the OSHA compliance officer will review the written program and interview the respiratory protection program administrator. Questions asked during the interview are likely to focus on determining how familiar the program administrator is with the OSHA Respiratory Protection standard and the use and application of the respirators at the particular workplace. Significant deficiencies in the written program also could indicate a lack of training and understanding of the standard.

Only one person can fulfill the primary responsibilities of running the program, unless your company has more than one worksite. Under that circumstance, you may have a program administrator for each site. Ordinarily, however, you cannot divide the responsibilities among several employees. Requiring an administrator with sole responsibility helps ensure the integrity of the program by maintaining continuous oversight from one person. Nonetheless, the administrator may rely on other employees to help run parts of the respiratory protection program (e.g., fit testing, medical evaluations).

One of the program administrator's primary responsibilities is to evaluate the program. Although OSHA recognizes the value of an objective assessment, the Agency did not want to burden small businesses with the cost of arranging for an outside party to conduct the evaluations, and the standard therefore allows program administrators to perform the program evaluations required under the standard.

(c)(4) EMPLOYER-PROVIDED RESPIRATORS

You must provide respirators, training, and medical evaluations at no cost to employees who are required to wear a respirator for protection from respiratory hazards at your workplace. This requirement reflects the philosophy that employers are obligated to provide and pay for necessary personal protective equipment (such as respirators) used by employees on the job.

Do I also have to pay for respirators for voluntary users?

No. You do not have to pay for respirators for voluntary respirator users. In such cases, you still must pay for required medical evaluations for voluntary users and provide voluntary users with appropriate facilities and time to clean, disinfect, maintain, and store respirators.

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CHECKLIST FOR RESPIRATORY PROTECTION PROGRAMS

Check to ensure that your facility has:

- Γ A written respiratory protection program that is specific to your workplace and covers the following:
 - Γ Procedures for selecting respirators.
 - Γ Medical evaluations of employees required to wear respirators.
 - Γ Fit testing procedures.
 - Γ Routine use procedures and emergency respirator use procedures.
 - Γ Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and maintaining respirators.
 - Γ Procedures for ensuring adequate air quality for supplied air respirators.
 - Γ Training in respiratory hazards.
 - Γ Training in proper use and maintenance of respirators.
 - Γ Program evaluation procedures.
 - Γ Procedures for ensuring that workers who voluntarily wear respirators (excluding filtering facepieces) comply with the medical evaluation, and cleaning, storing and maintenance requirements of the standard .
- Γ A designated program administrator who is qualified to administer the program.
- Γ Updated the written program as necessary to account for changes in the workplace affecting respirator use.
- Γ Provided equipment, training, and medical evaluations at no cost to employees.

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Section (d): RESPIRATOR SELECTION

(d)(1) GENERAL GUIDELINES FOR SELECTION

You must base selections of respirators on the hazards to which your employees are exposed and must consider how workplace and user factors affect respirator performance and reliability.

What are workplace and user factors?

Some examples include the following:

- # The size and configuration of the workspace—Are workers equipped with air supplied respirators able to fit into any tight space in your workplace?
- # Ease of worker communication—Are your employees wearing respirators able to communicate with one another and warn one another of hazards?
- # Ease or difficulty of the work or rate of activity—Are your employees doing heavy lifting that may deplete the air supply of a self-contained breathing apparatus (SCBA)? Would a fast work pace lead to discomfort, causing the employee to move the respirator and, thus, affect the fit?
- # Workplace conditions such as temperature and humidity or the location and movement of other personnel and equipment—Would the temperature and humidity affect the effectiveness of filters, cartridges, and other respirator parts as well as the comfort of the wearer? Would the mobility of your employees or the presence of moving machinery entangle the airlines of atmosphere-supplying respirators?

(d)(1)(iii) You need to Identify and Evaluate Worksite Hazards

- # Identify the chemicals to which your employees are exposed and evaluate the hazards of those chemicals.
- # Determine the state and physical form of the chemical. Are they solids, liquids, or gases? Do the liquids and solids give off vapors or do they form dusts or mists?
- # Estimate or measure employee exposures to the hazards.

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Respiratory hazards may be present in the workplace in the following physical forms:

Dusts and fibers are solid particles that are formed or generated from solid materials through mechanical processes such as crushing, grinding, drilling, abrading or blasting. Examples are lead, silica, and asbestos.

Fumes are solid particles that are formed when a metal or other solid vaporizes and the molecules condense (or solidify) in cool air. Examples are metal fumes from smelting or welding. Fumes also may be formed from processes such as plastic injection or extrusion molding.

Mists are tiny droplets of liquid suspended in the air. Examples are oil mist produced from lubricants used in metal cutting operations, acid mists from electroplating, and paint spray mist from spraying operations.

Gases are materials that exist as individual molecules in the air at room temperature. Examples are welding gases, such as acetylene and nitrogen, and carbon monoxide produced from internal combustion engines.

Vapors are the gaseous form of substances that are normally in the solid or liquid state at room temperature and pressure. They are formed by evaporation. Most solvents produce vapors. Examples include toluene and methylene chloride.

Biological hazards include bacteria, viruses, fungi, and other living organisms that can cause acute and chronic infections if breathed in. Examples include Legionnaire's Disease, flour, and animal products (dander, excreta).

Some Suggestions for Measuring or Making "Reasonable" Estimates of Worker Exposures

- # Personal monitoring is the most accurate way of obtaining worker exposure information. Sampling equipment and analytical methods are available for the vast majority of substances regulated by OSHA's Air Contaminants standard (29 CFR 1910.1000 and 29 CFR 1926.55). OSHA has specific monitoring requirements for its substance-specific standards (i.e., benzene or asbestos). See Subpart Z of *Title 29 Code of Federal Regulations*, parts 1910 and 1926, for OSHA's substance-specific standards.

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- # You can also estimate exposures by monitoring fixed locations or by sampling for short time durations. If you do this, you should measure under worst case conditions to be sure you are providing adequate protection for your employees. For example, if you select a respirator based on a reading obtained from a fixed sample collected close to the source of emission, the respirator may provide adequate worker protection because workers generally move about and do not spend their workshift near the source of emissions. Similarly, a respirator selected on the basis of the reading obtained from a spot sample taken when the process is operating at peak conditions may provide adequate protection because process emissions under non-peak conditions are less than at peak conditions.
- # Data may be available to you from previous exposure measurements. For example, studies may have been conducted in your industry. Your trade association may have data, or, manufacturers of products or materials used in your workplace may have conducted laboratory tests that provide worker exposure data. To generalize from data obtained from these sources or an industry-wide survey, however, you must show that the conditions that existed in the survey, such as the processes, types of materials, control methods, work practices, and environmental conditions, are similar to those in your own workplace.
- # You should be aware that exposures can be quite variable from day to day and from worker to worker. It is therefore important always to err on the side of over- rather than underprotection.
- # You may wish to consult with health and safety professionals in evaluating exposures. However, consultation is not mandatory. The respiratory protection program administrator should have the necessary qualifications. You can probably obtain consultants through the organizations listed in the sources of help at the end of this chapter. The OSHA Consultation Program (see Appendix II for a list of programs by state) and your insurance carrier are other potential sources of assistance.

What if I am unable to determine my employees' exposure?

You must consider the worksite atmosphere IDLH, Immediately Dangerous to Life or Health and select respirators on that basis. IDLH means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere (29 CFR 1910.134 paragraph (b)). However, you may be able to demonstrate, through information on processes and reasonable assumptions about potential maximum concentrations, that IDLH conditions would not occur.

- (d)(1)(ii) You Must Select a Respirator Certified by the National Institute for Occupational Safety and Health (NIOSH).** The respirator must be used in compliance with the conditions of its

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certification. See the sources of help at the end of this chapter for addresses and telephone numbers of NIOSH.

- (d)(1)(iv) You must select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.** You should provide a sufficient assortment of respirators so that your employees will obtain acceptable fits. OSHA's requirement is performance oriented; however, if medical evaluations of employees show that their health may be impaired by using negative pressure respirators, you must provide them with powered air-purifying respirators.

(d)(2) RESPIRATORS FOR IDLH ATMOSPHERES

(d)(2)(i) Types of respirators

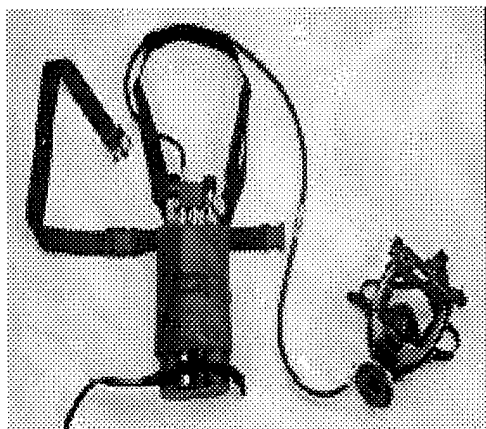
IDLH environments require the highest level of respiratory protection and reliability. You must provide either of the following for use in IDLH environments:

- # Full-facepiece pressure-demand SCBAs that are certified by NIOSH for a minimum service life of 30 minutes.



Full facepiece SCBA

- # Combination full-facepiece pressure-demand supplied-air respirators with auxiliary self-contained air supply.



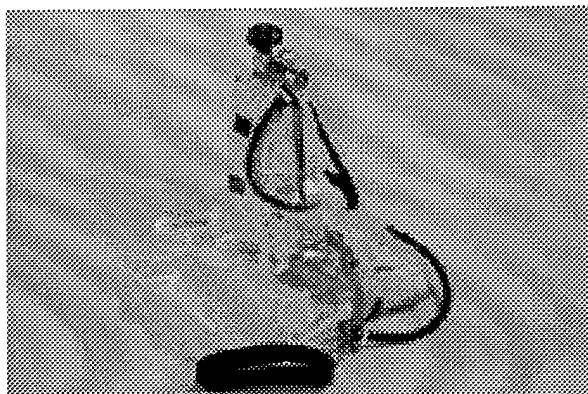
SAR with auxiliary SCBA.



SAR with auxiliary SCBA.

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- (d)(2)(ii) Respirators for escape from IDLH atmospheres must be NIOSH certified for escape from the atmosphere in which they will be used.** For example, for formaldehyde exposures, escape respirators may be a full facepiece with chin style, front, or back-mounted industrial canister approved against formaldehyde (29 CFR 1910.1048).



Emergency escape breathing apparatus

- (d)(2)(iii) You must consider all oxygen-deficient atmospheres to be IDLH.** Atmosphere-supplying respirators must be used in oxygen-deficient atmospheres (where oxygen is less than 19.5%). You may use any atmosphere-supplying respirator if you can demonstrate that, under all reasonable foreseeable conditions, the oxygen concentration in the work area can be maintained within the ranges specified in the following table (Table II of 29 CFR 1910.134). Otherwise, you must provide employees with full facepiece pressure demand SCBAs or combination full facepiece pressure demand supplied-air respirators with auxiliary self-contained air supply.

TABLE 1

Altitude	Oxygen deficient atmospheres (% O ₂) for which the employer may rely on any atmosphere supplying respirator.
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Less than	16.0-19.5
3001.....	16.4-19.5
3001-	17.1-19.5
4000.....	17.8-19.5
4001-	18.5-19.5
5000.....	19.3-19.5
5001-	
6000.....	
6001-	
7000.....	
7001-	
8000.....	

Above 8000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

Table 1 specifies, by altitude, the oxygen concentrations in which any type of atmosphere-supplying respirators may be used. For example, if your workplace is located at sea level and you can demonstrate that the oxygen content in the oxygen deficient environment will be maintained between 17 and 19%, then you may use any atmosphere-supplying respirator.

Work operations being conducted in well-controlled atmospheres where oxygen levels are deficient (below 19.5 percent) are typically permit-required confined spaces (see OSHA's Permit-Required Confined Space standard, 29 CFR 1910.146).

(d)(3) RESPIRATORS FOR NON-IDLH ATMOSPHERES

(d)(3)(i) You must provide respirators that are adequate to protect employee health and ensure compliance with all other OSHA requirements under routine and reasonably foreseeable emergency situations. Other OSHA regulations include the Air Contaminants standard, 29 CFR 1910.1000, the substance-specific standards, appropriate safety regulations such as the Hazardous Waste Operations and Emergency Response standard, 29 CFR 1910.120 paragraph (g)(2), and many construction and maritime standards.

Also, the General Duty Clause of the Occupational Safety and Health Act requires you to protect your employees from substances not regulated by OSHA, but which are known to be hazardous at levels encountered in the workplace. Consult the Material Safety Data Sheet (MSDS) sent by your chemical supplier if you have questions about the toxicity of a particular substance. For further assistance in ascertaining whether substances used in your workplace that are not regulated by OSHA are hazardous, see the sources of help (at the end of this chapter) and the list of OSHA Area Offices (Appendix II).

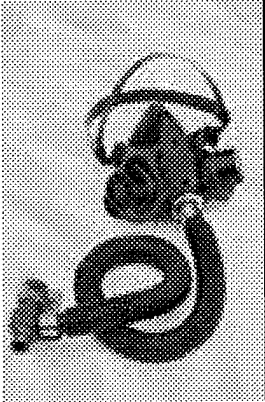
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- (d)(3)(ii)** You must select respirators that are appropriate for the chemical state and physical form of the contaminant. See the section discussing the identification of worksite hazards. You need different types of filters, cartridges, and canisters depending on whether dusts, fumes, mists, vapors, and gases are present in your workplace and depending on the kinds and concentrations of substances present. Refer to NIOSH and the other sources of help listed at the end of this chapter.

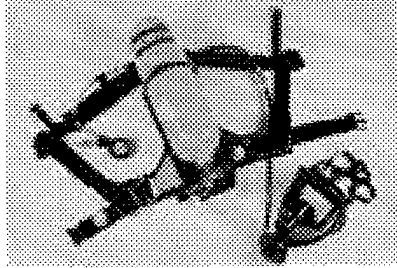
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(d)(3)(iii) Respiratory protection for gases and vapors

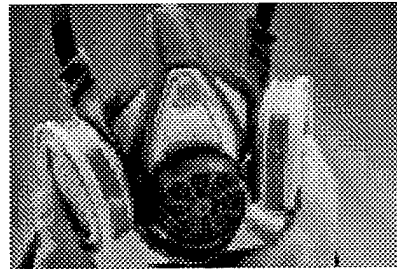
For protection against gases and vapors, you can select either atmosphere-supplying respirators or air-purifying respirators.



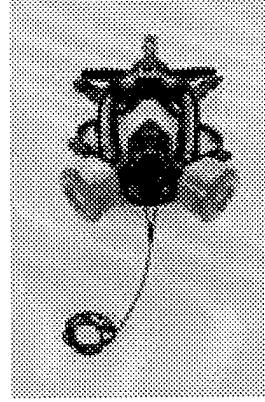
Half-facepiece SAR



Full-facepiece SCBA



Half-facepiece APR



Full facepiece PAPR

You must meet the following conditions if your employees use air-purifying respirators.

- # The respirator must be equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or
- # If there is no appropriate ESLI, you must implement a change schedule for canisters and cartridges based on objective information that will ensure that canisters and cartridges are changed before the end of their service life.

You do not want to have situations where the canisters or cartridges become saturated and the gases or vapors break through the canisters or cartridges, allowing the contaminants to get inside the mask and into your employees' breathing zones.

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Why not just rely on the employee's ability to detect the odor of the substance when the gas or vapor breaks through?

You may not rely on the detection of odor as protection against respiratory hazards posed by gases and vapors because:

- # Most toxic substances do not have appropriate sensory (odor or irritant) warning properties.
- # Some chemicals have odors that are only detectable above their established exposure limits, meaning the employees will smell the chemical only after they have already been exposed to unsafe levels of the contaminant.
- # Individuals' abilities to perceive particular odors may differ quite markedly from the population average due to any of a variety of innate, chronic, or acute physiological conditions. For example, about 10 percent of people have a markedly impaired sense of smell.
- # There is no good screening mechanism to identify persons with sensory receptor problems.
- # Continuing exposure to the odor usually results in diminution or even disappearance of the smell sensation. This phenomenon is known as olfactory fatigue. When this happens, the worker unknowingly gets used to the contaminant breaking through the cartridge/canister and loses the ability to detect its smell.

What is an end of service life indicator (ESLI)?

An ESLI is a mechanism for warning the user that a respirator is approaching the end of its ability to provide protection. The warning appears on the cartridge itself. For example, after a period of use, an indicator on a cartridge with sorbent material will signal that protection against organic vapors is approaching saturation or is no longer effective.

So far, NIOSH has approved ESLIs for only four cartridges or canisters (mercury vapor, carbon monoxide, ethylene oxide and hydrogen sulfide). Thus, you most likely will have to establish change schedules to ensure that cartridges and canisters are changed before their end-of-service-life.

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What must be considered when developing change schedules?

You must develop cartridge change schedules based on available data or information that can be relied upon to ensure that cartridges are changed before the end of their useful service life.

You need to consider the following factors in determining change schedules:

- # The contaminants the respirator is to protect against.
- # The concentrations of contaminants in the work area.
- # Frequency of use—(e.g., is the respirator used continuously or intermittently throughout the shift?)
- # Temperature, humidity and air flow through the cartridge or canister.
- # Employees' work rates.
- # The presence of other potentially interfering chemicals.

You should assume worst case conditions to avoid breakthrough earlier than anticipated. You should document the information relied upon and the basis for the change schedules you use in your written respiratory protection program.

Where can I get help on developing change schedules?

You should consult with your respirator supplier or manufacturer for guidance on developing change schedules specific to your work conditions. Some suppliers have prepared materials that may assist you with developing change schedules for your worksite. Other possible sources of help include your trade association, and/or the resources listed at the end of this chapter.

Further information to help you develop change schedules is forthcoming. Several trade associations are currently gathering published information, such as breakthrough test data (i.e., how long it takes a substance to break through the cartridge or canister and get into the facepiece), and plan to produce a guidance document to help employers develop change schedules. OSHA is also developing instructional materials on change schedules, which will be a useful tool for employers

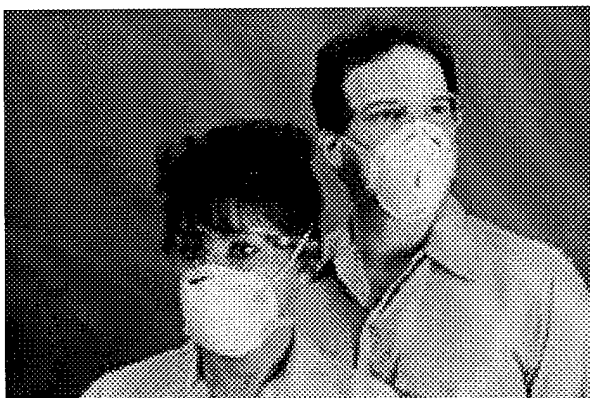
(d)(3)(iv) Respiratory protection for particulates

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What are my options for protection against particulates?

You have three options:

- # Atmosphere-supplying respirators.
- # Air-purifying respirators (including filtering facepieces) with filters certified by NIOSH under 30 CFR part 11 as high efficiency particulate (HEPA) filters, or filters certified by NIOSH under 42 part 84.
- # Air-purifying respirators with any filter certified for particulates by NIOSH for protection against contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least two micrometers.



Particulate APR, N95

See the sources of help section at the end of this chapter for advice and information in determining whether or not contaminants in your workplace consist primarily of particles of two micrometers or more.

What types of particulate filters are available for air-purifying respirators (APRs)?

Particulate-removing cartridges contain filters that reduce inhaled concentrations of toxic dusts and fiber, such as lead and asbestos, fumes, mists, and radioactive and biological materials (such as grain dusts). Powered and non-powered APRs require different particulate filters. Only HEPA filters are appropriate for protection against particulates for powered APRs.

The nine filter types for use with non-powered APRs are based on three levels of filter efficiency and three levels of resistance to degradation by oil. The three levels of filter efficiency are 95, 99, and 99.97 percent. These are referred to as 95, 99 and 100 filters, respectively. The three levels of oil resistance are N (non oil resistant), R (oil resistant)

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and P (oil proof). The most common commercially available cartridges are the "N95" (not oil resistant and 95 percent efficient) and "P100" (oil proof and 99.97 percent efficient). The P100 is comparable to the HEPA filter that is used with PAPRs.

Do I need to use particulate filters with ESLI?

ESLIs are not needed with particulate-removing filters. The employee should be trained to change the filter when he or she has difficulty breathing due to a lack of air being drawn through the filter. This is an indication that the filter has become loaded with particulate.

Where can I go for help?

Sources of help include:

- # *NIOSH Respirator Decision Logic*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health. Request DHHS (NIOSH) Publication No. 87-108. NIOSH also has a help line. The telephone number is 1-800-35 NIOSH.
- # American National Standard for Respiratory Protection (ANSI Z88.2). American National Standards Institute, 11 West 42nd Street, New York, New York, 10036.
- # Respirator manufacturers provide advice through product literature, sales staff, and telephone help lines. The Industrial Safety Equipment Association (ISEA) has contact information. ISEA can be reached at: 1901 N. Moore Street, Suite 808, Arlington VA. 22209, or (703) 525-1695, or www.safetycentral.org/isea.
- # Chemical manufacturers may provide information on the nature and properties of substances to which your employees may be exposed. You should be able to obtain information from the Material Safety Data Sheets (MSDSs) provided by the supplier of the chemical.
- # You can contact the American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave., Bldg. D-7, Cincinnati, Ohio, 45211-4438 for advice and information on exposure measurement and estimation and other related industrial hygiene subjects. ACGIH has published the ACGIH Ventilation Manual, which contains calculations applied to certain situations to estimate worker exposures.

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- # You can also contact the American Industrial Hygiene Association (AIHA), 2700 Prosperity Ave., Suite 250, Fairfax, Virginia, 22031 for advice and information on exposure measurement and estimation. Members of AIHA's Exposure Assessment Strategy's Committee are knowledgeable in worker exposure measurement and estimation.

- # The National Library of Medicine provides free online help about chemical hazards. Through TOXNET, located at <http://toxnet.nlm.nih.gov/servlets/simple-search>, you can search a number of databases on toxicology, hazardous chemicals and other related subjects for information on respiratory hazards.

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CHECKLIST FOR RESPIRATOR SELECTION

Check that at your facility:

- Γ Respiratory hazards in your workplace have been identified and evaluated.
- Γ Employee exposures that have not been, or cannot be, evaluated are considered IDLH.
- Γ Respirators are NIOSH certified, and used under the conditions of certification.
- Γ Respirators are selected based on the workplace hazards evaluated and workplace and user factors affecting respirator performance and reliability.
- Γ A sufficient number of respirator sizes and models are provided to be acceptable and correctly fit the users.
- Γ For IDLH atmospheres:
 - Γ Full facepiece pressure demand SARs with auxiliary SCBA unit or full facepiece pressure demand SCBAs, with a minimum service life of 30 minutes, are provided.
 - Γ Respirators used for escape only are NIOSH certified for the atmosphere in which they will be used.
 - Γ Oxygen deficient atmospheres are considered IDLH.
- Γ For Non-IDLH atmospheres:
 - Γ Respirators selected are appropriate for the chemical state and physical form of the contaminant.
 - Γ Air-purifying respirators used for protection against gases and vapors are equipped with ESLIs or a change schedule has been implemented.
 - Γ Air-purifying respirators used for protection against particulates are equipped with NIOSH-certified HEPA filters or other filters certified by NIOSH for particulates under 42 CFR part 84.

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Section (e): MEDICAL EVALUATION

This section of the Respiratory Protection standard requires employers to implement medical evaluations to determine a worker's ability to use a respirator.

This requirement is necessary because using a respirator may place a burden on a worker's health. This burden varies according to a number of factors, such as the weight and breathing resistance of the respirator and the workplace conditions under which the respirator is worn. Specific medical conditions that may place an employee at increased risk of illness, injury, or death include:

- # Cardiovascular and respiratory disease, such as high blood pressure, angina, asthma, chronic bronchitis, or emphysema.
- # Cardiovascular damage caused by heart attack or stroke.
- # Reduced lung function caused by factors such as smoking or prior exposure to respiratory hazards.
- # Neurological disorders, such as epilepsy.
- # Musculoskeletal disorders, such as lower back pain.
- # Psychological conditions, such as claustrophobia and severe anxiety.

(e)(1) EMPLOYER-PROVIDED MEDICAL EVALUATIONS

You must provide an employee with a medical evaluation to determine his or her ability to use a respirator. If a worker refuses to be medically evaluated for the use of a respirator, he or she cannot perform a job that requires a respirator.

When do I need to provide an employee with a medical evaluation?

The medical evaluation must be provided ***before*** the employee is fit tested and uses the respirator in your workplace for the first time.

You may stop providing a worker with medical evaluations when the worker is no longer required to use a respirator.

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Are medical evaluations required for all types of respirators?

Medical evaluations are required for both positive pressure and negative pressure respirators (except for filtering facepieces (dust masks)).

When elastomeric or supplied-air respirators are worn voluntarily by workers (not required by you or OSHA), you must ensure that the workers are medically able to wear the respirators and that they are provided with the information in Appendix D to the standard. The procedures for making this medical determination must be part of a written respiratory protection program. When your employees wear dust masks (filtering facepiece respirators), however, no written medical-determination procedures are required.

Do I need to provide medical evaluations for seasonal and temporary workers?

You must provide seasonal and temporary workers with medical evaluations. The frequency or length of a worker's term of employment does not affect the requirement for medical evaluations.

(e)(2) MEDICAL EVALUATION PROCEDURES

This portion of the standard specifies that the medical evaluation can be performed by using a medical questionnaire or by an initial medical examination that obtains the same information as the medical questionnaire.

Identification of a Medical Professional

Employers must identify a physician or another licensed health care professional (PLHCP) to perform the medical evaluations.

Who can perform a medical evaluation?

Physicians are not the only health care professionals allowed to perform medical evaluations for respirator use. The Respiratory Protection standard allows any PLHCP to administer the medical questionnaire (described below) or to conduct the medical examination if doing so is within the scope of the PLHCP's license. You must check with PLHCPs in your local area to see if performing the medical evaluation is within the scope of their professional license. Or you may check with your state licensing board. Appendix IV, Questions and Answers on the Respiratory Protection standard, lists state licensing

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boards.

Can a nurse perform a medical evaluation?

Any health care professional, including a nurse, who qualifies as a PLHCP can perform a medical evaluation. If a nurse does not qualify as a PLHCP, he or she may still be able to perform a medical evaluation if he or she is doing so under the supervision of a physician, and the physician performs the final review of the assessment.

Can an employee request to see his or her own physician for a medical evaluation?

Yes, but you may find this arrangement difficult to administer. If employees select their own physicians, you will need to maintain contact with each physician, and you will need to send each physician the supplemental information described in paragraph (e)(5) of the standard. You must allow the employee to be evaluated during the employee's normal working hours or at a time that is convenient to the employee, and you also are responsible for paying for this service (even if the employee has coverage under an insurance plan).

The Medical Questionnaire: The medical questionnaire is designed to identify general medical conditions that place employees who use respirators at risk of serious medical consequences.

If you choose to use the medical questionnaire to conduct the medical evaluation, you must use the questionnaire contained in the Respiratory Protection standard (Appendix C of the standard, Sections 1 and 2). The language in Appendix C of the standard is mandatory and cannot be altered. The PLHCP determines whether or not Part B of the questionnaire needs to be administered, and the PLHCP can alter the questions in Part B in any manner he or she thinks is appropriate.

You may choose to use medical examinations in place of the questionnaire, but you are not required to do so. Although the questionnaire does not have to be administered during the medical examination, the PLHCP must obtain the same information from the worker that is contained in the questionnaire.

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(e)(3) FOLLOW-UP MEDICAL EXAMINATIONS

You must provide follow-up examinations for employees who give positive answers to any of the questions numbered 1 through 8 in Section 2, Part A. You must also provide follow-up exams to employees who will be using SCBAs or full-face respirators who respond positively to questions 10 through 15. See Appendix C of the standard (Appendix I of this document). Also, you must provide a follow-up examination if the questionnaire or initial medical examination indicates that one is necessary.

As part of the follow-up examination, the PLHCP may include any tests, consultations, or diagnostic procedures that are needed to make a final determination about an employee's ability to use a respirator. In some cases, all that might be needed is a phone call to the employee from the PLHCP to clarify an issue from the questionnaire.

A PLHCP may investigate a medical condition that is not addressed in the questionnaire if the PLHCP has reason to believe that the condition could affect the employee's ability to wear a respirator.

If the PLHCP is not a physician, some medical issues may arise during the follow-up examination that may be outside the scope of the PLHCP's license. In such cases, a physician must be involved.

(e)(4) ADMINISTRATION OF QUESTIONNAIRES AND EXAMINATIONS

Procedures for Administering the Medical Evaluation: When you provide a medical evaluation program:

- # You must protect the confidentiality of the employee who is being evaluated.
- # The questionnaire or medical examination must be given during an employee's normal work hours or at a time and place convenient to the employee.
- # The employee must understand the questions on the medical questionnaire.

Who pays for the medical evaluation?

You must pay for the medical evaluation and any related expenses—including travel costs—incurred by your employee during the evaluation.

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How can I ensure that an employee's medical evaluation remains confidential?

You must provide your employees with instructions on how to deliver or send the completed questionnaire to the PLHCP who will review it. This can be done, for example, by supplying them with stamped, pre-addressed envelopes for mailing their completed questionnaires to the PLHCP.

If an employee does not speak English or cannot read, how can I make sure that he or she understands the questions on the medical questionnaire?

You can send the employee directly to a PLHCP who is able to help the employee fill out the questionnaire. For non-English speakers, you may want to consider supplying an interpreter to help the PLHCP interpret the questionnaire for your employee. The standard does not require you to hire a professional interpreter; instead, you may use an English-speaking family member or friend of the employee, or another employee who speaks both English and the employee's language, who can help the employee fill out the questionnaire.

Employee's Right to Contact the PLHCP

The standard requires you to inform employees that a PLHCP is available to discuss the medical questionnaire with them, and to allow employees to discuss the results of their questionnaire with the PLHCP. This discussion will enable employees and PLHCPs to clarify questions that were asked on the questionnaire, and for employees to explain answers that they provided.

How can I notify employees about how to contact the PLHCP?

You could post the PLHCP's name and telephone number in a location that is easily accessible to all workers (such as a lunch room or break area). You could also include the information in a separate sheet with the medical questionnaire.

(e)(5) SUPPLEMENTAL INFORMATION FOR THE PLHCP

This portion of the Respiratory Protection standard requires you to provide the PLHCP with specific information to be used to make the determination about an employee's ability to use a respirator. This information includes:

- # The type and weight of the respirator to be worn by the employee.

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- # The duration and frequency of respirator use (including use for rescue and escape).
- # The level of physical effort that the employee would be expending while wearing a respirator.
- # Additional personal protective clothing and equipment that the employee would wear.
- # The temperature and humidity extremes that may be encountered in the work environment where respirator use is required.

In addition, you must provide the PLHCP with the following:

- # A copy of your written respiratory protection program.
- # A copy of the Respiratory Protection standard.

Why do I need to provide the PLHCP with a copy of the written respiratory protection program and the Respiratory Protection standard?

This requirement helps ensure that PLHCPs have a thorough understanding of their duties and responsibilities in the medical evaluation process. Your written respiratory protection program will provide the PLHCP with critical information about the working conditions that could increase the burden placed on the employee's health during respirator use.

Does the PLHCP need to visit the worksite to perform a medical evaluation?

No, the supplemental information required in this portion of the standard is sufficient for the PLHCP to make a valid recommendation on the employee's ability to wear a respirator. OSHA, however, encourages PLHCPs to visit the worksite if they believe the information obtained there would be useful to them.

If I select a new PLHCP, do I need to have my employees reevaluated?

No, but you must make sure that the new PLHCP has the information required in this section. You must either provide the information directly to the new PLHCP, or you must make sure that the information is transferred from the former PLHCP to the new PLHCP.

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How often do I need to provide the PLHCP with supplemental information?

You need to supply the information to the PLHCP only when the conditions of respirator usage change.

(e)(6) MEDICAL DETERMINATION

This portion of the standard requires you to obtain a recommendation from the PLHCP about the employee's ability to use a respirator. The PLHCP's recommendation must be in writing, and it must include the following information:

- # A determination of whether or not the employee is medically able to use a respirator.
- # Any limitations on respirator use related to the medical condition of the employee or to the workplace conditions in which the respirator will be used.
- # The need, if any, for follow-up medical evaluations.
- # A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

Note that you are required to have the PLHCP provide a copy of the written recommendation to each employee.

Who is responsible for making the final decision about an employee's ability to wear a respirator?

You are responsible for making the final determination. The PLHCP's opinion is an important factor that you must consider in making this determination.

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Is the information from the medical evaluation confidential, or can the PLHCP share this information with me?

The PLHCP must keep strictly confidential any information revealed during the medical evaluation; your access is limited to the information contained in the PLHCP's written recommendation.

Can I receive a copy of the employee's completed medical questionnaire?

No, you must only maintain a copy of the PLHCP's written recommendation in a confidential file.

Negative Pressure Respirators: If the PLHCP determines that an employee is unable to wear a negative pressure respirator, perhaps because of a breathing problem such as asthma or bronchitis, but would be able to wear a powered air-purifying respirator (PAPR), you must provide the employee with a PAPR. If, however, the PLHCP determines in a subsequent medical evaluation that the worker can wear a negative pressure respirator, you no longer need to provide the worker with a PAPR.



PAPR

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(e)(7) ADDITIONAL MEDICAL EVALUATIONS

This portion of the standard requires you to provide an employee with additional medical evaluations whenever the following events occur:

- # The employee reports symptoms related to his or her ability to use a respirator.
- # The PLHCP, respiratory protection program administrator, or supervisor determines that a medical reevaluation is necessary.
- # Information from the respiratory protection program suggests a need for reevaluation.
- # Workplace conditions (such as protective clothing, temperature, or level of work effort) have changed so that an increased burden is placed on the employee's health.

Do I need to provide my employees with a medical reevaluation annually or according to some other fixed schedule?

Yes, you must provide medical reevaluations in accordance with the PLHCP's recommendation.

Do I need to provide an employee who is unable to use a respirator with an alternative job at no loss of pay and other benefits?

Although the standard does not require that employees receive such benefits, other OSHA substance-specific standards may contain this requirement.

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CHECKLIST FOR MEDICAL EVALUATION

Check that at your facility:

- Γ All employees have been evaluated to determine their ability to wear a respirator prior to being fit tested for or wearing a respirator for the first time in your workplace.
- Γ A physician or other licensed health care professional (PLHCP) has been identified to perform the medical evaluations.
- Γ The medical evaluations obtain the information requested in Sections 1 and 2, Part A of Appendix C of the standard, 29 CFR 1910.134.
- Γ Employees are provided follow-up medical exams if they answer positively to any of questions 1 through 8 in Section 2, Part A of Appendix C, or if their initial medical evaluation reveals that a follow-up exam is needed.
- Γ Medical evaluations are administered confidentially during normal work hours, and in a manner that is understandable to employees.
- Γ Employees are provided the opportunity to discuss the medical evaluation results with the PLHCP.
- Γ The following supplemental information is provided to the PLHCP before he or she makes a decision about respirator use:
 - Γ Type and weight of the respirator.
 - Γ Duration and frequency of respirator use.
 - Γ Expected physical work effort.
 - Γ Additional protective clothing to be worn.
 - Γ Potential temperature and humidity extremes.
 - Γ Written copies of the respiratory protection program and the Respiratory Protection standard.

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CHECKLIST FOR MEDICAL EVALUATION (cont.)

- Γ Written recommendations are obtained from the PLHCP regarding each employee's ability to wear a respirator, and that the PLHCP has given the employee a copy of these recommendations.
- Γ Employees who are medically unable to wear a negative pressure respirator are provided with a powered air-purifying respirator (PAPR) if they are found by the PLHCP to be medically able to use a PAPR.
- Γ Employees are given additional medical evaluations when:
 - Γ The employee reports symptoms related to his or her ability to use a respirator.
 - Γ The PLHCP, respiratory protection program administrator, or supervisor determines that a medical reevaluation is necessary.
 - Γ Information from the respiratory protection program suggests a need for reevaluation.
 - Γ Workplace conditions have changed in a way that could potentially place an increased burden on the employee's health.

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Section (f): FIT TESTING

This section of the Respiratory Protection standard requires you to conduct fit testing on all employees who are required to wear a respirator that includes a tight-fitting facepiece.

Fit testing is a procedure used to determine how well a respirator “fits”—that is, whether the respirator forms a seal on the user’s face. If a good facepiece-to-face seal is not achieved, the respirator will provide a lower level of protection than it was designed to provide. For example, without a good seal, the respirator can allow contaminants to leak into the user’s breathing air.

This section also describes:

- # What types of respirators must be fit tested
- # How often fit testing must be conducted
- # What procedures must be used
- # How the results of fit testing should be used to guide respirator selection

INTRODUCTORY CONCEPTS

As a general introduction to the topic of fit testing, several fundamental concepts are defined below. These definitions expand on those provided with the actual standard (see Appendix I of this guide).

As described below, there are two types of fit testing: quantitative and qualitative.

What is quantitative fit testing (QNFT)?

Quantitative fit testing is a method of measuring the amount of leakage into a respirator. It is a numeric assessment of how well a respirator fits a particular individual.

To quantitatively fit test a respirator, a sampling probe or other measuring device must be placed on the inside of the respirator facepiece. The respirator wearer then performs the user seal checks followed by the selected QNFT.

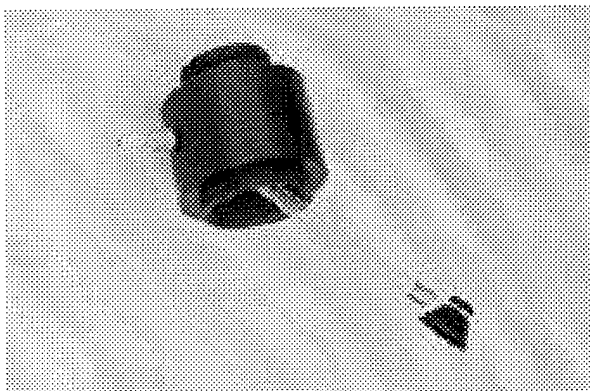
- # For the generated aerosol QNFT, he or she stands inside a “test chamber” (booth or hood), where a nontoxic aerosol is introduced into the air. Measurements are

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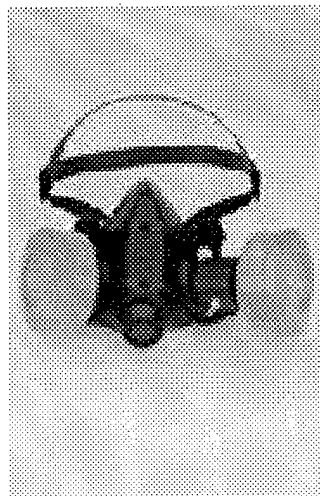
then taken of the aerosol concentration both inside the test chamber and inside the respirator. An assessment of the quantitative fit is made based on the ratio of the aerosol concentration inside the test chamber to the concentration inside the facepiece.

- # For the condensation nuclei counter QNFT, ambient air particles are used as the test aerosol with measurements made of their concentration outside and inside the facepiece, and an assessment is made of the quantitative fit of the facepiece.
- # The controlled negative pressure QNFT method uses a fit test instrument to exhaust air from inside the respirator facepiece to maintain a constant negative pressure. The measurement of the exhaust stream required to maintain a constant negative pressure yields a measure of the leakage into the facepiece.

Detailed protocols for quantitative fit testing are provided as part of the standard (see Appendix A of the standard in Appendix I of this document).



Fit test adapter



Facepiece with fit test adapter inserted

What is qualitative fit testing (QLFT)?

Qualitative fit testing is a non-numeric pass/fail test that relies on the respirator wearer's response to a substance ("test agent") used in the test to determine respirator fit.

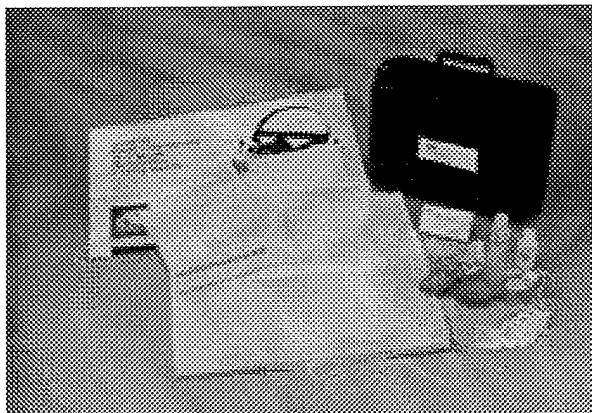
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In qualitative fit testing, after performing user seal checks, the respirator wearer stands in an enclosure and a test agent is introduced, such as:

- # Banana oil (isoamyl acetate)
- # Saccharin
- # Bitrex
- # Irritant smoke (without a test enclosure)

If the individual can smell the test agent (or is irritated by the smoke), this indicates that the agent leaked into the facepiece and that the respirator has failed the test because a good facepiece-to-face seal has not been achieved. If the employee cannot successfully complete the qualitative test with a particular respirator, the employee must then be tested with another make, size, or brand of respirator.

Detailed protocols for qualitative fit testing are provided as part of the standard (see Appendix B of the standard in Appendix I of this document).



Bitrex QLFT kit

What is a tight-fitting facepiece?

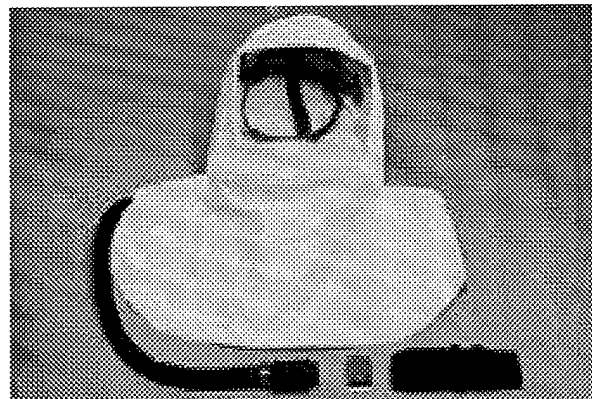
A tight-fitting facepiece is intended to form a complete seal with the respirator wearer's face. This seal must be sufficiently tight to prevent any contaminants in the work environment from leaking around the edges of the facepiece into the user's breathing air.

In contrast, a loose-fitting facepiece is specifically designed to form a partial seal with the user's face. Such a facepiece typically covers at least the head and includes a system through which clean air is distributed into the breathing zone. For example, hoods, suits, and helmets are all loose-fitting facepieces. Such equipment does not rely on a tight facepiece-to-face seal to protect the worker, and is useful for workers with facial hair or other physical characteristics that make it difficult to wear a tight-fitting facepiece.

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Tight-fitting facepiece



Loose-fitting hood

What are positive pressure and negative pressure respirators?

Positive pressure respirators maintain positive air pressure inside the facepiece throughout the user's breathing cycle. That is, the air pressure inside the facepiece remains greater than the air pressure outside the facepiece. Thus, any leakage around the facepiece seal should result in air escaping from inside the facepiece to the outside environment rather than worksite contaminants leaking into the facepiece and breathing air.

In contrast, a negative pressure respirator will have a lower air pressure inside the facepiece than outside during inhalation. If the facepiece-to-face seal leaks on these types of respirators, air contaminants will be drawn into the breathing air.

What is the fit factor?

The fit factor is a quantitative measure of how well a particular respirator fits (or provides protection to) an individual. It is the ratio of the concentration of a contaminant in the environment to the concentration inside the mask.

Fit factors are obtained from quantitative fit testing. For example, if an employee was in a test chamber that contained 300 ppm of aerosol and 3 ppm of the test agent was found inside the mask, the fit factor would be equal to 100.

(f)(1) RESPIRATORS THAT REQUIRE FIT TESTING

You must ensure that quantitative or qualitative fit testing is conducted for all employees required to wear either positive or negative pressure tight-fitting facepiece respirators. This includes both air-purifying and atmosphere-supplying respirators operating in either a positive or negative

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pressure mode, but does not include any loose-fitting facepieces.

Must I perform fit testing for employees who voluntarily wear tight-fitting facepiece respirators ?

No. If an employee chooses to wear a tight-fitting facepiece respirator (including a negative pressure air-purifying respirator or a filtering facepiece (dust mask)) in a worksite environment where such equipment is not necessary, you are not required to conduct fit testing.

(f)(2) WHEN FIT TESTING MUST BE CONDUCTED: GENERAL REQUIREMENTS

You must ensure that fit testing is conducted for all employees required to wear tight-fitting facepiece respirators as follows:

- # Prior to initial use.
- # Whenever an employee switches to a different tight-fitting facepiece respirator (for example, a different size, make, model, or type).
- # At least annually.

(f)(3) WHEN FIT TESTING MUST BE CONDUCTED: CHANGES IN THE RESPIRATOR WEARER'S PHYSICAL CONDITION

You must ensure that an additional fit test is conducted if an employee experiences a change in physical condition that could affect the seal on the tight-fitting facepiece respirator. This requirement is triggered by a physical change:

- # Reported by the respirator user.
- # Observed by you, a physician or other licensed health care professional, the supervisor, or the program administrator.

Physical changes in the employee that might affect the facepiece-to-face seal could include, for example, an obvious change in body weight, facial scarring, extensive dental work, or cosmetic surgery.

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(f)(4) WHEN FIT TESTING MUST BE CONDUCTED: UNACCEPTABLE FIT AS DETERMINED BY AN EMPLOYEE AFTER FIT TESTING

If, after fit testing, an employee reports that his or her respirator does not fit properly, you must allow the employee a reasonable opportunity to select a different tight-fitting facepiece respirator. After another respirator is selected, you must conduct a new fit test on the employee's replacement equipment.

An employee might determine that the facepiece does not establish an effective facepiece-to-face seal, for example, upon smelling a worksite contaminant while wearing the respirator with new cartridges. Or an employee might hear or feel air leaking around the facepiece-to-face seal. The employee's determination also can be based on factors unrelated to the particular worksite. For example, the employee might find that he or she can't wear the respirator for extended periods without experiencing irritation or pain.

(f)(5) FIT TESTING PROCEDURES: GENERAL REQUIREMENTS

You must ensure that all fit testing conducted for employees required to wear tight-fitting facepiece respirators follows the OSHA approved protocols.

Detailed protocols for qualitative and quantitative fit testing are provided as part of the standard (see Appendices A and B of the standard in Appendix I of this document). These protocols specify that you must have on hand during fit testing all types and sizes of respirators that are available for use at the worksite. This allows you to ensure that each employee is tested with the same type of respirator (make, model, style, and size) that he or she will wear at the worksite.

(f)(6) LIMITATION ON USE OF QUALITATIVE FIT TESTING

The table at the end of this chapter summarizes acceptable means of fit testing (QLFT versus QNFT) for different types of respirators. For more information, consult OSHA's web site at [www@OSHA.gov](http://www.OSHA.gov).

Qualitative fit-testing may be used to fit test all positive pressure respirators (air-supplying and PAPRs), and any negative pressure air-purifying respirators that must achieve a fit factor of 100 or less. Dividing the fit factor of 100 by a standard safety factor of 10 indicates that the negative pressure air-purifying respirators that have successfully completed a qualitative fit test can be relied on to reduce a worker's exposure by a protection factor of 10. The safety factor of 10 is used because protection factors that workers achieve at work sites tend to be much lower than the fit factors achieved during fit testing.

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In practice, this means that any negative pressure air-purifying respirator (APR) may be qualitatively fit tested if the APR is to be used in workplace atmospheres where the level of the hazardous contaminant is 10 times or less than the permissible exposure limit (PEL) and lower than the level that is immediately dangerous to life or health (IDLH). For example, if the PEL for a specific workplace contaminant is 5 ppm, you could use a qualitative fit test to fit test a negative pressure APR to be used in the workplace at exposure levels up to 50 ppm (ten times the PEL or less). If the workplace exposure level is greater than 50 ppm, however, you must use quantitative fit testing.

Both half-facepiece APRs and full-facepiece APRs may be qualitatively fit tested if they are to be worn in work areas where the concentration of contaminant is no more than ten times the PEL.

What is a PEL?

OSHA PELs (permissible exposure limits) establish the maximum level of a specific contaminant that a worker can be exposed to, averaged over an 8-hour work day (8-hour time-weighted average, or TWA) or over a specified portion of a work day (for example, a 15 minute short-term exposure limit, or STEL). (PELs are listed in 29 CFR 1910.1000, and 1926.55. Also see the substance-specific standards for general industry and construction.)

(f)(7) USE OF QUANTITATIVE FIT TESTING

If quantitative testing is used to fit test a tight-fitting facepiece respirator, respirator fit is not acceptable unless:

- # For a half or quarter facepiece: The fit factor achieved in the test is greater than or equal to 100
- # For a full facepiece: The fit factor achieved in the test is greater than or equal to 500

(f)(8) FIT TESTING FOR ATMOSPHERE-SUPPLYING AND POWERED AIR-PURIFYING RESPIRATORS

You must ensure that all fit testing conducted for employees issued tight-fitting atmosphere-supplying respirators and powered air-purifying respirators is conducted in the negative pressure mode, even if the respirator is to be worn with positive pressure.

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This is because it is difficult outside of a laboratory test situation to accurately perform fit testing on positive pressure respirators.

In what circumstances might an atmosphere-supplying or powered air-purifying respirator perform like a negative pressure respirator?

For example, if the blower component of a powered air-purifying respirator loses power because it is turned off or the batteries run out, the respirator will become a negative pressure respirator. Similarly, atmosphere-supplying respirators can shift momentarily to negative pressure respirators if the air supply is restricted or the system fails.

Also, powered air-purifying respirators and self-contained breathing apparatus units can perform like negative pressure respirators as the user increases his or her inhalation rate during heavy work. The increased inhalation rate can result in negative pressure spikes inside the facepiece that are greater than the positive pressure of the air being supplied. This is called overbreathing the respirator. Therefore, positive air flow alone cannot be counted on to prevent the leakage that can occur with a poorly fitting facepiece.

You can conduct qualitative or quantitative fit testing of tight-fitting atmosphere-supplying respirators and powered air-purifying respirators according to the following requirements.

Qualitative fit testing. To conduct qualitative fit testing on an atmosphere-supplying respirator, you must do one of the following:

- # Temporarily convert the user's actual facepiece into a negative pressure respirator by installing the appropriate filters. If you are not sure how to do this, check with the respirator manufacturer or your supplier.
- # Use an identical negative pressure facepiece (size, make, model).

You can conduct qualitative fit testing on a powered air-purifying respirator by simply turning off the blower.

Quantitative fit testing. To conduct quantitative fit testing on an atmosphere-supplying respirator, you must temporarily or permanently install a sampling probe or adaptor inside the facepiece.

In preparation for testing, you should contact the respirator manufacturer or supplier for information on whether a sampling adaptor can be temporarily installed in the facepiece. Any modifications made to a respirator for testing purposes must be removed before use.

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If temporary modifications cannot be made, you will need to permanently convert the facepiece to allow for testing. If you permanently convert the facepiece—for example, by drilling a hole in the respirator facepiece to insert the probe—you cannot repair the hole and put the respirator back in service. Once a hole is drilled in the facepiece, the respirator can only be used for fit testing purposes. It is no longer approved for workplace use.

TABLE 2

Acceptable Fit-testing Methods		
Respirator	QLFT	QNFT
Half-Face, Negative Pressure, APR (<100 fit factor)	Yes	Yes
Full-Face, Negative Pressure, APR (<100 fit factor) used in atmospheres up to 10 times the PEL	Yes	Yes
Full-Face, Negative Pressure, APR (>100 fit factor)	No	Yes
PAPR	Yes	Yes
Supplied-Air Respirators (SAR), or SCBA used in Negative Pressure (Demand Mode) (>100 fit factor)	No	Yes
Supplied-Air Respirators (SAR), or SCBA used in Positive Pressure (Pressure Demand Mode)	Yes	Yes
SCBA - Structural Fire Fighting, Positive Pressure	Yes	Yes
SCBA/SAR - IDLH, Positive Pressure	Yes	Yes
Mouthbit Respirators	Fit-testing Not Required	
Loose-fitting Respirators (e.g., hoods, helmets)		

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CHECKLIST FOR FIT TESTING

Check that at your facility:

- Γ Employees who are using tight fitting respirator facepieces have passed an appropriate fit test prior to being required to use a respirator.
- Γ Fit testing is conducted with the same make, model, and size that the employee will be expected to use at the worksite.
- Γ Fit tests are conducted annually and when different respirator facepieces are to be used.
- Γ Provisions are made to conduct additional fit tests in the event of physical changes in the employee that may affect respirator fit.
- Γ Employees are given the opportunity to select a different respirator facepiece, and be retested, if their respirator fit is unacceptable to them.
- Γ Fit tests are administered using OSHA-accepted QNFT or QLFT protocols.
- Γ QLFT is only used to fit test either PAPRs, SCBAs, or negative pressure APRs that must achieve a fit factor of 100 or less.
- Γ QNFT is used in all situations where a negative pressure respirator is intended to protect workers from contaminant concentrations greater than 10 times the PEL.
- Γ When QNFT is used to fit negative pressure respirators, a minimum fit factor of 100 is achieved for tight-fitting half-facepieces and 500 for full-facepieces.

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CHECKLIST FOR FIT TESTING (cont.)

- Γ For tight-fitting atmosphere-supplying respirators and powered air-purifying respirators:
 - Γ Fit tests are conducted in the negative pressure mode.
 - Γ QLFT is achieved by temporarily converting the facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure APR
 - Γ QNFT is achieved by modifying the facepiece to allow for sampling inside the mask midway between the nose and mouth. The facepiece is restored to its NIOSH approved configuration before being used in the workplace.

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Section (g): USE OF RESPIRATORS

As part of your written program, you must establish and implement procedures for the proper use of respirators in both routine jobs and emergencies. Specific use procedures are required to:

- # Prevent leaks in the respirator facepiece seal.
- # Prevent employees from removing respirators in hazardous environments.
- # Ensure that respirators operate effectively throughout the work shift.
- # Protect employees entering IDLH atmospheres and interior structural firefighting situations.

(g)(1) PREVENTING LEAKS IN THE FACEPIECE SEAL

Facepiece seals and valves are important in tight-fitting respirators. Tight-fitting respirators have a complete seal to the face. If there is a leak in the seal of a tight-fitting respirator or valve, then the respirator cannot reduce the wearer's exposures to respiratory hazards. You must be sure that nothing interferes with the seal of the respirator to the worker's face or with the valves.

Conditions that can interfere with the seal or valve are specified in the standard and include:

- # Facial hair,
- # Facial scars,
- # Jewelry or headgear that projects under the facepiece seal,
- # Missing dentures, and
- # Corrective glasses or goggles or other personal protective equipment:
 - Face shields
 - Protective clothing
 - Helmets
 - Eyeglass insert or spectacle kits

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Workers may use this equipment with tight-fitting respirators if you ensure that the equipment is worn in a way that:

- # Does not interfere with the face-to-facepiece seal.
- # Does not distort the worker's vision.
- # Does not cause physical harm to the worker (e.g., if the eyeglass insert did not fit properly so that the tight fit of the respirator caused the insert to press against his or her forehead, eyes, or temples).

You must make sure that the respirator does not interfere with the worker's eyewear or force the worker to remove the eyewear altogether.

What if a worker has a condition that does not interfere with the face-to-facepiece seal?

As long as the condition does not interfere with the function of the respirator valves, then the worker can wear a tight-fitting respirator, provided that the worker has no other conditions that interfere with the face-to-facepiece seal or valve. For example, a mustache may not interfere with the facepiece seal but may interfere with the valve function.

Do these restrictions apply to all types of respirators?

The restrictions for facial hair and other conditions apply ONLY to tight-fitting respirators. Several respiratory protection alternatives, such as loose-fitting hoods or helmets, are available to accommodate workers with facial hair or with other conditions that might interfere with the seal of the facepiece to the face of the user.

Can employees wear contact lenses?

Contact lenses can be safely worn with respirators.

You must be sure that workers perform user seal checks each time they put on a tight-fitting respirator. User seal checks are a quick and easy way for workers to verify that they have put on their respirators correctly and that the respirators are working properly.

To conduct a user seal check, the worker must follow either the procedures for a user seal check that are contained in Appendix B-1 of the Respiratory Protection standard or equally effective procedures that the respirator manufacturer recommends for conducting a user seal check.

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How are user seal checks conducted?

To conduct a user seal check, the worker performs a negative or positive pressure fit check.

For the negative pressure check, the worker:

- covers the respirator inlets (cartridges, canisters, or seals)
- gently inhales, and
- holds breath for 10 seconds.

The facepiece should collapse on the worker's face and remain collapsed.

For the positive pressure check, the worker:

- covers the respirator exhalation valve(s); and
- exhales.

The facepiece should hold the positive pressure for a few seconds. During this time, the worker should not hear or feel the air leaking out of the face-to-facepiece seal.

Appendix B-1 of the Respiratory Protection standard provides detailed instructions on how to conduct the user seal check.

The manufacturer's recommended procedures for checking the facepiece seal may be used if the employer demonstrates that the manufacturer's procedures are as effective as those described in Appendix B-1 of the Respiratory Protection standard, e.g., these procedures are effective in identifying respirators that fit poorly when put on or adjusted.

Can a user seal check be used as a substitute for a qualitative fit test?

A user seal check is **not** a substitute for a qualitative fit test. Fit testing is a more rigorous procedure that is used to determine whether the respirator fits the face of the worker. Section (f) of this Compliance Guide contains a complete discussion on respirator fit testing.

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How can employers ensure that workers perform user seal checks?

The intent of the standard is that you make sure that the fit and performance of the respirator is not compromised. You must take actions that will result in safe work practices. Examples of these actions include:

- # Providing training to workers
- # Routinely observing work practices
- # Routinely monitoring site conditions
- # Consulting employees

(g)(2) CONTINUING RESPIRATOR EFFECTIVENESS

You must be aware of conditions in work areas where employees are using respirators. You must also allow employees to leave the respirator use area to perform any activity that involves removing or adjusting a respirator facepiece, or if there is any indication that a respirator may not be fully effective. If there is any indication that they are not functioning properly, you must replace, repair, or discard respirators, before allowing employees to return to an area in which respirator use is required.

How can I conduct appropriate surveillance?

“Appropriate surveillance” means that you must routinely look for any changes that may affect the effectiveness of a respirator. You must look for changes in the work area, such as changes in work tasks or processes, that can result in changes in the hazard or the time period of exposure, or that put the employee in closer proximity to the hazard. Another change might be the addition of new machinery that would cause an employee to exert more energy and breathe harder.

By “appropriate surveillance” OSHA means that you must routinely observe employees as they work while wearing respirators. By observing respirator use under actual workplace conditions, you can determine:

- # Whether other protective equipment is interfering with respirator use.
- # Whether a change in working conditions may result in exposure to new contaminants.

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- # Whether workers are experiencing discomfort, such as skin irritation or breakthrough of contaminants through cartridges and canisters.

If any of these conditions exist, you must make adjustments—such as providing a more protective respirator or a different size or style of respirator, or altering work practices to reduce the stress on workers—to ensure that workers continue to receive adequate respiratory protection.

When must I allow workers to leave the respirator use area?

To maintain their respirators, workers may, from time to time, need to leave the area where respirator use is required and go to a safe area free of respiratory hazards and contaminants.

Workers must leave the respirator use area:

- # If the worker needs to wash his or her face or the respirator facepiece to prevent eye or skin irritation associated with respirator use.
- # If the worker detects vapor or gas breakthrough (that is, the cartridge or canister is saturated with contaminant and needs to be changed).
- # If the worker notices that the facepiece is leaking.
- # If the worker observes a change in breathing resistance (that is, the filter is full of dust or other particles and needs to be changed).
- # If the respirator or parts of the respirator, such as valves or straps, are not working properly and need to be replaced.

Workers need a “safe area” in the workplace where they can safely remove their respirators to wash or conduct the maintenance necessary to ensure the respirator’s adequate operation.

Where does the safe area need to be located?

The safe area must be located in a place that is free of respiratory hazards or contamination. As long as these conditions are met, the safe area can be in a location that minimizes interruptions to work flow.

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When must I replace or repair respirators?

You must replace or repair respirators that are not working properly. Respirators should not be used if they are defective in any way. You must replace or repair a defective respirator whenever the worker detects vapor or gas breakthrough, changes in breathing resistance, or facepiece leakage, before allowing the worker to return to the work area where respirator use is required.

How often do respirators need to be replaced or repaired?

There is no required replacement schedule for respirators in general. However, damaged respirators cannot properly protect employees. Respirators need to be replaced or repaired when one or more of their components is missing, damaged, or visibly deteriorated.

(g)(3) PROCEDURES FOR IMMEDIATELY DANGEROUS TO LIFE OR HEALTH ATMOSPHERES (IDLH) AND FOR INTERIOR STRUCTURAL FIREFIGHTING

This section of the Respiratory Protection standard contains requirements for respirator use in IDLH environments. The standard defines IDLH as “an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual’s ability to escape from a dangerous atmosphere.” Section d of this Compliance Guide (Selection of Respirators) contains additional information about IDLH environments.

The provisions of paragraph (g)(3) of the Respiratory Protection standard are requirements for respirator use in all IDLH atmospheres. Paragraph (g)(4) contains additional requirements applicable only to the extra-hazardous environments encountered during interior structural fire fighting (two-in/two-out; use SCBAs only). OSHA considers interior structural firefighting environments to be IDLH environments. These two paragraphs ((g)(3) and (g)(4)) deal with requirements for standby personnel and the respirator users inside the IDLH atmosphere. The standard requires standby personnel when workers use respirators in IDLH environments. These two provisions are intended to ensure that adequate rescue capability exists in case of respirator failure or some other emergency inside the IDLH environment.

Who are standby persons?

Standby personnel remain outside the IDLH atmosphere. They must be available, trained, and equipped to assist respirator users inside the IDLH atmosphere, and to provide effective emergency rescue, when needed.

You must be sure that standby personnel maintain visual, voice, or signal line communication with the workers in the IDLH environment. Standby personnel may use radios to communicate with workers inside the IDLH environment. You must be sure that standby personnel notify you or

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your designated representative before entering the IDLH atmosphere. Once notified, you must provide necessary assistance appropriate to the situation.

When do I need to have more than one standby person located outside the IDLH environment?

A single standby person is adequate if an IDLH environment is well-characterized and controlled and if one person can easily maintain communication with all workers in the IDLH environment. Two stand-by personnel are required for interior structural firefighting. An IDLH atmosphere is "well-characterized" if it has been monitored and the results of the monitoring have been analyzed, or if it has been through a process hazard analysis. (Chemical plants conduct comprehensive process hazard analyses as required by OSHA's Process Safety Management standard [29 CFR 1910.119] to determine which process units pose IDLH hazards.)

Often, only one respirator user at a time is exposed to an IDLH atmosphere, and a single standby person can easily monitor that worker's status. Even in situations where more than one respirator user is inside an IDLH environment, a single standby person can often provide adequate communication and support. For example, one standby person can easily communicate with more than one employee working inside a small pump room or shed.

More than one standby person may be required for other situations. For example, to clean and paint the inside of a multi-level, multi-portal water tower, a process that often generates a deadly atmosphere as a result of cleaning solution and paint solvent vapors, employees often enter the tower through different portals to work on different levels. In such a situation, there will be a need for good communication at each entry portal, and more than one standby person would be needed to maintain adequate communication and accessibility.

For interior structural firefighting, you must have two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times. You must also have two standby personnel located outside the IDLH atmosphere; all employees engaged in interior structural fire fighting must use SCBAs.

When must standby personnel maintain communication with workers in the IDLH atmosphere?

At all times. Voice and visual or hand signal line communication must be maintained between the employee(s) in the IDLH environment and the standby person. Because IDLH conditions present the potential for serious injury or death, there is little margin for error in an IDLH environment. Equipment malfunction in an IDLH environment can

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swiftly disable workers, prevent them from leaving the environment, and lead to severe injury or death. For this reason, close communication between standby personnel and respirator users in the IDLH environment is critical.

When is radio communication acceptable?

Standby personnel may communicate by radio with workers inside the IDLH environment. Although workers inside the IDLH atmosphere may also communicate by radio, these workers must remain in visual contact.

Is voice communication the only acceptable method for workers in the IDLH environment and standby personnel to communicate with one another?

No. Communication can be in the form of hand signals if the workers in the IDLH atmosphere and the standby personnel remain in view of one another. Signal lines may also be used. It is also advisable to have several means of communication systems on hand, in the event that one form of communication fails.

What is appropriate training and equipment for the standby personnel?

You must train the standby personnel to:

- # Provide effective emergency rescue; **and**
- # Notify you or your designated representative before the standby personnel enter the IDLH atmosphere to provide emergency rescue.

You must equip your standby personnel with the following:

- # Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; **and**
- # Either appropriate retrieval equipment for removing the workers inside the IDLH atmosphere where retrieval equipment would contribute to the rescue of the workers inside the IDLH atmosphere and would not increase the overall risk resulting from entry; **or**
- # Equivalent means for rescue where retrieval equipment could increase the overall risk resulting from entry.

For workers involved in interior structural firefighting, standby personnel must be equipped with

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SCBAs.

Rescue personnel must be properly trained and protected before they enter the IDLH environment. The Hazardous Waste Operations and Emergency Response standard (29 CFR 1910.120) and the Permit-Required Confined Spaces standard (29 CFR 1910.146) provide guidance on the training and protective equipment that is required. Situations exist in which retrieval lines (harnesses, wristlets, anklets) may pose an entanglement problem, especially in areas in which air lines or electrical cords are present in the work areas in which the IDLH atmosphere occurs. Most of the time, however, rescue with retrieval equipment is effective, and much safer for the rescuers, because the standby personnel do not have to enter the IDLH atmosphere.

If there is an emergency can the standby provide immediate rescue assistance?

Your standby personnel must inform either you or your designated representative before attempting emergency rescue within an IDLH environment. Your designated representative may be a properly trained employee or response team or local firefighting and emergency rescue personnel. In any case, proper arrangements and procedures must be in place before you can allow your workers to enter an IDLH environment. Once notified, you must provide necessary assistance appropriate to the situation.

This provision of the standard is intended to ensure that you know when an emergency has occurred so that you or your designated representative can send in immediate additional assistance to help in the rescue.

When should standby personnel enter the IDLH environment?

Under most circumstances, standby personnel should not enter the IDLH environment until you or your designated representative has responded to the notification acknowledging that an emergency exists, that rescue personnel are entering the IDLH environment, and that emergency response units are on their way to provide additional assistance. You must provide standby personnel (rescuers) with proper respiratory equipment, and you must train and prepare your standby personnel to facilitate rescue attempts.

This notification provision is not intended to suggest that standby employees should wait indefinitely for you or your authorized designee to respond to notification before entering the IDLH atmosphere when your workers inside are in danger and standby personnel are appropriately trained and equipped to provide assistance. In the majority of cases, however, rescuers should not enter the IDLH environment until receiving some response from you (i.e., you or your designated representative should know that the rescuers are entering and emergency response units should be on their way to the incident).

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How must I provide appropriate assistance in emergencies?

Once you or your designated representative has been notified, you or your representative must provide the necessary assistance appropriate for the situation. You must make sure that:

- # Rescue operations are carried out appropriately
- # Rescuers are provided with proper respiratory equipment
- # Designated employees are adequately prepared to conduct rescue attempts

You may not always need to send standby personnel into the hazardous atmosphere. In some cases, the worker within the IDLH environment will be able to get out on his or her own, or retrieval equipment may enable rescuers to retrieve the worker without entering the hazardous atmosphere. In these instances, you will need to provide workers inside IDLH atmospheres and standby personnel employees with emergency medical treatment. If standby employees do need to enter the hazardous environment to perform rescue operations, however, you must make sure that those rescuers are fully protected.

You should consult OSHA's rules on confined spaces (29 CFR 1910.146) and on hazardous waste operations and emergency response (29 CFR 1910.120) for other provisions that may apply to IDLH environments.

(g)(4) PROCEDURES FOR INTERIOR STRUCTURAL FIREFIGHTING

This portion of the standard applies to workers engaged in interior structural firefighting only.

What is interior structural firefighting?

Firefighting to control or extinguish a fire in an advanced stage of burning inside a building. Because the fire is producing large amounts of smoke, heat, and toxic products of combustion, exposure to firefighters is extremely hazardous and the environment is considered IDLH.

Are all firefighters engaged in interior structural firefighting covered by the standard?

The Respiratory Protection standard applies directly to private sector workers engaged in firefighting, including those working in industrial fire brigades and private incorporated fire companies, and to federal employees covered under Section 19 of the Occupational Safety and Health Act.

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Federal OSHA's jurisdiction does not extend to employees of state and local governments; therefore, public sector firefighters are covered only in the 25 states which operate their own OSHA-approved occupational safety and health state programs and are required to extend the provisions of their state standards to these workers. These states and territories are: Alaska, Arizona, California, Connecticut, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming.

Coverage of volunteers varies by state and depends on state law. State and local government employees in states that do not operate OSHA-approved state plans are not covered by these requirements, unless the requirements are voluntarily adopted for local applicability.

What additional requirements apply to interior structural firefighting?

In addition to the requirements for all IDLH atmospheres, if your workers are involved in interior structural firefighting, you must be certain that:

- # At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times.
- # At least two employees are located outside the IDLH atmosphere.
- # All employees engaged in interior structural firefighting use SCBAs.

Although two individuals must always be located outside the IDLH atmosphere, one may be assigned to an additional role, such as incident command, pump operations, or operator of the fire apparatus—so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident. Any assignment of additional duties to the second firefighter must be weighed against the potential for the additional duties to interfere with assistance or rescue activities.

Must firefighters wait until four workers are assembled before attempting to rescue victims inside the burning structure?

No. There is an explicit exemption in the Respiratory Protection standard that states that, if life is in jeopardy, the "two-in, two-out" requirement is waived. The incident commander and the firefighters at the scene must decide whether the risks posed by entering the interior structural fire before at least four firefighters have assembled is outweighed by the need to rescue a victim who life may be at risk.

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CHECKLIST FOR PROPER USE OF RESPIRATORS

Check your facility to be certain that:

- Γ Workers using tight-fitting respirators have no conditions, such as facial hair, that would interfere with a face-to-facepiece seal or valve function.
- Γ Workers wear corrective glasses, goggles, or other protective equipment in a manner that does not interfere with the face-to-facepiece seal or valve function.
- Γ Workers perform user seal checks prior to each use of a tight-fitting respirator.
- Γ There are procedures for conducting ongoing surveillance of the work area for conditions that affect respirator effectiveness, and that, when such conditions exist, you take steps to address those situations.
- Γ Employees are permitted to leave their work area to conduct respirator maintenance, such as washing the facepiece, or to replace respirator parts.
- Γ Employees do not return to their work area until their respirator has been repaired or replaced in the event of breakthrough, a leak in the facepiece, or a change in breathing resistance.
- Γ There are procedures for respirator use in IDLH atmospheres and during interior structural firefighting to ensure that: the appropriate number of standby personnel are deployed; standby personnel and employees in the IDLH environment maintain communication; standby personnel are properly trained, equipped, and prepared; you will be notified when standby personnel enter an IDLH atmosphere; and you will respond to this notification.
- Γ Standby personnel are equipped with a pressure demand or other positive pressure SCBA, or a positive pressure supplied air respirator with an escape SCBA, and appropriate retrieval equipment or other means for rescue.
- Γ Procedures for interior structural firefighting require that: at least two employees enter the IDLH atmosphere and remain in contact with one another at all times; at least two standby personnel are used; and all firefighting employees use SCBAs.

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Section (h): MAINTENANCE AND CARE OF RESPIRATORS

You must provide respirator users with equipment that is clean, sanitary, and in good working order. To accomplish this you must have a system of respirator care and maintenance as a component of your respiratory protection program. Regular care and maintenance is important to ensure that the equipment functions as designed and protects the user from the threat of illness or death.

Your system of respirator care and maintenance must provide for:

- # cleaning and disinfection procedures
- # proper storage
- # regular inspections
- # repair methods

(h)(1) CLEANING AND DISINFECTING

Respirator equipment must be regularly cleaned and disinfected according to specified procedures (see Appendix B-2 of the standard in Appendix I of this document) or according to manufacturer specifications that are of equivalent effectiveness.

Cleaning and disinfection procedures are divided into the following:

- # Disassembly of components
- # Cleaning and disinfecting
- # Rinsing, drying, and reassembly
- # Testing

How often must respirators be cleaned and disinfected?

The frequency of cleaning and disinfecting or sanitizing respirators will depend in part on whether your employees share the equipment or are issued respirators for their exclusive use. Worksite conditions also will dictate cleaning frequency, e.g., working in a dirty

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environment will require that the respirator facepiece, in particular, be cleaned more frequently.



Respirator wipes are useful for cleaning

At a minimum:

If a respirator is...	Then...
issued for the exclusive use of an individual employee	the equipment must be cleaned and disinfected as often as necessary to be maintained in clean and sanitary condition.
used by more than one employee	the equipment must be cleaned and disinfected <i>before</i> being used by different individuals.
maintained for use in emergencies, testing, and training exercises	the equipment must be cleaned and disinfected <i>after</i> each use.

Who is responsible for cleaning and disinfecting respirators?

You may choose the program that best meets the needs of your workplace. For example, you may use a centralized operation where employees receive respirators that have been cleaned, disinfected and repaired by workers assigned to this task. You also may require that each respirator wearer be responsible for cleaning and maintaining his or her equipment. In either case, you must provide appropriate training, on-the-job-time, and the necessary equipment and supplies.

In addition, if individual employees are required to clean their own respirators, you must

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allow time during work hours for users to perform this function.

h(2) **STORAGE**

What are the proper storage procedures for respirators?

You must store respirators in a manner that:

- # Protects them from contamination, dust, sunlight, extreme temperatures, excessive moisture, damaging chemicals, or other destructive conditions.
- # Prevents the facepiece or valves from becoming deformed.
- # Follows all storage precautions issued by the respirator manufacturer.

In addition, if a respirator is intended for emergency use, it must be:

- # Kept accessible to the work area, but not in an area that may itself become involved in an emergency and become contaminated or inaccessible.
- # Stored in a compartment or cover (e.g., on a fire truck) that is clearly identified as containing emergency equipment.

h(3) **INSPECTION**

How often must respirators be inspected, and what procedures do I follow?

The frequency of and procedures for inspections depend on whether the respirator is intended for non-emergency, emergency, or escape-only use.

All respirator inspections must include:

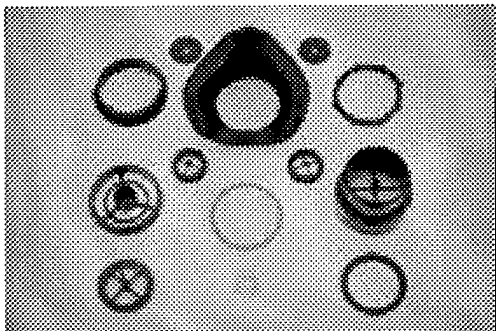
- # A check of respirator function, i.e., visual inspection to identify any parts that may be missing, distorted, blocked, loose, deteriorated, or otherwise interfere with proper performance.
- # A check of elastomeric (rubber) parts for pliability and deterioration.

In addition, inspect:

- # **Non-emergency use equipment.** *Before* each use and *during* cleaning and disinfection.

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- # **Self-contained breathing apparatus (SCBA).** *Monthly*, making sure the air and oxygen cylinders that are available for immediate use are maintained in a fully charged state (i.e., pressure is not below 90% of manufacturer's recommended level). You must also activate the regulator and low pressure warning devices to ensure that they function properly.
- # **Emergency use respirators.** *At least monthly*, checking for proper functioning *before and after each use*. When inspecting these types of respirators you must:
 1. Document the date of inspection, name or signature of inspector, inspection findings, any remedial action required, and serial number or other identification of the respirator.
 2. Retain this information with the respirator, storage compartment, or inspection report until next certification. You may use tags to document the inspections.
- # **Emergency escape-only equipment.** *Before* being carried into the workplace for use.



Inspection of SCBA nosecup

***h(4)* REPAIRS**

What do I do if a respirator fails to pass inspection?

If a respirator does not pass inspection, you must remove the respirator from service and discard, repair, or adjust it. Tagging out of service respirators is a good means for ensuring that defective respirators are not inadvertently used.

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Who performs the repair work?

Respirators may be repaired only by an appropriately trained person, who must use NIOSH-approved parts that are designed for the particular respirator being repaired.

Valves, regulators, and alarms must be adjusted and repaired only by the manufacturer or a technician trained by the manufacturer.

What are some examples of when a respirator should be removed from service?

- # A cartridge has become saturated or a contaminant has broken through the cartridge and must be replaced.
- # An alarm system is not functioning on an SCBA.
- # A respirator strap, buckle, or connection is damaged or missing.
- # The mask portion of a respirator is misshapen or degraded and can no longer form a good seal around the user's face.

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CHECKLIST FOR RESPIRATOR MAINTENANCE AND CARE

Check to make sure that your facility has met the following requirements:

Cleaning and Disinfecting

- Γ Respirators are provided that are clean, sanitary, and in good working order.
- Γ Respirators are cleaned and disinfected using the procedures specified in Appendix B-2 of the standard.
- Γ Respirators are cleaned and disinfected:
 - Γ As often as necessary when issued for the exclusive use of one employee.
 - Γ Before being worn by different individuals.
 - Γ After each use for emergency use respirators.
 - Γ After each use for respirators used for fit testing and training.

Storage

- Γ Respirators are stored to protect them from damage from the elements, and from becoming deformed.
- Γ Emergency respirators are stored:
 - Γ To be accessible to the work area.
 - Γ In compartments marked as such.
 - Γ In accordance with manufacturer's recommendations.

Inspections

- Γ Routine-use respirators are inspected before each use and during cleaning.
- Γ SCBAs and emergency respirators are inspected monthly and checked for proper function before and after each use.
- Γ Emergency escape-only respirators are inspected before being carried into the workplace for use.

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CHECKLIST FOR RESPIRATOR MAINTENANCE AND CARE (cont.)

- Γ Inspections include:
 - Γ Check of respirator function
 - Γ Tightness of connections
 - Γ Condition of the facepiece, head straps, valves, and cartridges.
 - Γ Condition of elastomeric parts.
- Γ For SCBAs, inspection includes checking that cylinders are fully charged, and that regulators and warning devices function properly.
- Γ Emergency use respirators are certified by documenting the inspection, and by tagging the information either to the respirator or its compartment, or storing it with inspection reports.

Repairs

- Γ Respirators that have failed inspection are taken out of service .
- Γ Repairs are made only by trained personnel.
- Γ Only NIOSH-approved parts are used.
- Γ Reducing and admission valves, regulators and alarms are adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

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Section (i): BREATHING AIR QUALITY AND USE

This section of the Respiratory Protection standard requires you to provide workers who are wearing atmosphere-supplying respirators with breathing air of high purity. Respirators that supply breathing air are generally used in highly hazardous work environments. It is critical that such respirator systems provide breathing air of optimal quality and that the equipment operates reliably.

More broadly, you are required to establish or continue a respiratory protection program that follows performance standards for the operation and maintenance of breathing air compressors, methods for ensuring breathing air quality, and requirements for the quality of purchased breathing air.

The requirements detailed in this section are critical for ensuring the integrity of high purity breathing air for use with respirators, whether the air is delivered in tanks by a supplier or produced on site using a compressor. Also, it is your responsibility to ensure that practices are in place for protecting the quality of breathing air while stored in containers and when being used by employees. These requirements are essential for protecting respirator-wearing workers from the threat of illness or death.

As detailed below, when using atmosphere-supplying respirators you must:

- # Provide breathing air that meets certain specifications.
- # Develop procedures to ensure the proper use of compressed gas cylinders and air compressors.
- # Implement certain precautions to avoid improper use of couplings on airline systems and confusion about breathing air containers.
- # Implement certain precautions to prevent exposure to carbon monoxide when using air compressors.

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ATMOSPHERE-SUPPLYING RESPIRATORS

Atmosphere-supplying respirators are used to provide breathing air from a source independent of the ambient atmosphere. The two types of such equipment are:

- # Self-contained breathing apparatus (SCBA) units, for which air is supplied from a tank (a cylinder of compressed air or oxygen). For this type of respirator, the source of the breathing air is designed to be transported by or with the equipment user.
- # Supplied-air respirators (SARs) (also known as airline respirators), which receive air from a connecting hose. The source of air is either a pressurized cylinder or an air compressor. Because the employee does not carry the air on his or her back when using a SAR, breathing air can be provided over a longer time than is the case with a SCBA.

How is breathing air delivered to the respirator user?

Air compressors capture air from the surrounding environment, filter it, remove oil (if necessary), compress it to increase its density, and deliver the air through a system of regulators that brings the air back down to a breathable pressure for the respirator user.

With SCBA units, the pressurized breathing air is transferred from the tank to the respirator user through regulators that decrease the pressure to a level that a human can breathe. Because there is a fixed amount of air in the tank, the user can only rely on it for a given period of time. That time varies based on the size of the tank, the amount of pressure in the tank, and the physical effort required by the respirator user. Use times range from 20 minutes for low pressure tanks (2,500 psi) to 45 minutes for high pressure tanks (4,500 psi).

The air delivered by both types of system is at slightly greater than atmospheric pressure, which assists in preventing contaminated air from seeping through gaps in the facepiece or other areas.

(i)(1) SPECIFICATIONS FOR BREATHING AIR

You must ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen meet certain specifications as outlined below for breathing by employees wearing atmosphere-supplying respirators. Unless you produce your own breathing air from a compressor, you can rely on certificates of analysis from air suppliers to ensure that breathing air meets the required

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specifications.

Types of Breathing Air

Compressed air is the most common type of breathing air system used in worksite applications because it is the most convenient and least expensive. Compressed air is provided either through compressed air cylinders or air compressors at relatively high pressures. Regulators are used to ensure that breathing air supplied to respirators is provided at pressures that are safe for workers to breathe.

Other types of breathing air systems include liquid air, compressed oxygen, and liquid oxygen. Liquid air is air that exists in a liquid state, which is achieved by compressing purified air and chilling it to a temperature below the boiling point of its principal components (i.e., nitrogen and oxygen). Compressed oxygen systems are used in limited applications because they present a significant fire hazard. Liquid oxygen is quite expensive and also presents a significant fire hazard. It is generally used only in very specialized applications.

Specifications

- (i)(1)(i) Compressed and liquid oxygen.** Such forms of oxygen must meet the U.S. Pharmacopoeia requirements for medical or breathing oxygen.
- (i)(1)(ii) Compressed breathing air.** Any compressed breathing air must meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air (G-7.1-1989). This specification requires that:
 - (A) #** Oxygen content in compressed breathing air must be 19.5 to 23.5 percent of the total volume of air.
 - (B) #** Condensed hydrocarbon content in compressed breathing air must be 5 milligrams (mg) per each cubic meter (m^3) of air or less.
 - (C) #** Carbon monoxide content in compressed breathing air must be 10 parts per million (ppm) or less.
 - (D) #** Carbon dioxide content in compressed breathing air must be 1,000 ppm or less.
 - (E) #** There must be a lack of any noticeable odor from the compressed breathing air.

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(i)(2)&(3) OXYGEN USE

Explosion/fire hazard from compressor oil and grease. You must prohibit employees from using compressed oxygen in respirators that have previously been used with compressed air. The reason for this prohibition is that oil and grease can be introduced into respirator airlines used for compressed air, posing a danger of fire or explosion from the high pressure oxygen coming in contact with the oil or grease. Airline systems contain inline filters for capturing impurities so that the respirator user will not inhale the oil or grease.

Explosion/fire hazard from high concentration oxygen. You must ensure that employees use oxygen concentrations greater than 23.5 percent only with equipment designed specifically for oxygen service and distribution. Such equipment is specifically designed to minimize the risk of fire or explosion posed by the high concentration of oxygen.

(i)(4) CYLINDER USE

You must ensure that cylinders used with atmosphere-supplying respirators meet the following requirements:

- # Cylinders of breathing air must be tested and maintained according to Department of Transportation (DOT) Shipping Container Specification Regulations (49 CFR Parts 173 and 178), which include provisions for the construction, testing, and maintenance of cylinders. These steps are necessary to prevent explosions that can result from a rupture in a breathing air cylinder under high pressure. (Additional guidance is available in OSHA 29 CFR 1910.101(b), which includes provisions for in-plant handling and storage of compressed gas cylinders.)
- # Cylinders of purchased breathing air must be accompanied by a certificate from the supplier indicating that the contents of each cylinder have been tested and found to meet the criteria for Grade D breathing air. This certification will provide you with a reasonable assurance that the breathing air supplied to your employees is safe.
- # Cylinder contents must have a moisture level that does not exceed a dew point of minus 50°Fahrenheit (F) (minus 45.6°Celsius [C]) at 1 atmosphere pressure. (Dew point refers to the temperature at which the air is saturated with moisture.) This requirement is intended to prevent respirator valves from freezing when excess moisture accumulates on the valves, which can cause blockages in the flow of breathing air. You should verify with the supplier that the breathing air meets this requirement.

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(i)(5)-(7) COMPRESSOR USE

General Requirements

You must ensure that compressors used with atmosphere-supplying respirators provide breathing air according to the following requirements:

(i)(5)(i) Location of compressor during use. The location of an air compressor during use is very important to maintain the purity of the supplied breathing air. For this reason, an air compressor in use must be located so that the air intake component is not drawing from areas that contain:

- # Combustion exhaust from vehicles or the compressor itself.
- # Plant process exhaust, which should be exhausted to the outside by the facility's ventilation system.
- # Contaminated air from hazardous work areas.

(i)(5)(ii) Low moisture content of ambient air. The moisture content of compressed air must be kept to a minimum to prevent freezing of respirator valves at cold temperatures, which can cause blockages in the flow of breathing air. To ensure a low moisture content, the dew point at one atmosphere must be 10°F (5.56°C) below the ambient temperature (in plant).

Are there any systems for keeping moisture from getting into a compressor?

Water traps or desiccators can keep moisture out of a compressor. These systems remove the water from the air as it is run through the compressor, ensuring a certain level of dryness when it comes out. Such systems, like all other parts of a compressor, must be maintained in accordance with the manufacturer's instructions to properly remove the moisture.

(i)(5)(iii) Inline air purification. Suitable air-purifying beds and filters must be used in the supply lines to ensure delivery of a continuous flow of Grade D breathing air to the respirator user. (A sorbent bed is a filter designed to capture impurities in the air.) You must maintain, refurbish, or replace inline sorbent beds and filters as specified by the equipment manufacturer.

(i)(5)(iv) Tracking of bed and filter changes. You must ensure that a tag is maintained at/on the compressor with a note indicating when the sorbent beds and filters were last changed. The notation must include the signature of the person you have authorized to perform the bed and filter maintenance. Only a tag indicating the *most recent* filter and bed changes needs to be retained at/on the compressor.

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Requirements Regarding Carbon Monoxide

You must take certain precautions in regard to carbon monoxide when using compressors with atmosphere-supplying respirators. These precautions are required because:

- # Exposure to carbon monoxide above certain levels can be fatal.
- # Sources of this potentially lethal gas are fairly common in many worksites. (In fact, one source of carbon monoxide is the exhaust from the compressor itself.)
- # You will not be able to detect the presence of carbon monoxide because it is an odorless gas.

The types of precautions you will need to take depend on the type of compressor you use.

(i)(6) Compressors that are not oil lubricated. With this type of compressor, you must ensure that carbon monoxide in the breathing air is less than or equal to 10 ppm. This can be achieved by:

- # Locating the compressor's air intake component in an area free of contaminants
- # Conducting continuous or frequent monitoring of the breathing air supply
- # Using inline carbon monoxide filters
- # Using high-temperature alarms or shut-off devices

Must each of these methods be used for compressors that are not oil lubricated?

No. You must use whichever of the above methods are necessary to ensure that carbon monoxide does not contaminate the breathing air. In some cases, one method may be all that is needed. In other cases, you may be required to use more than one of these methods. You must evaluate your own worksite conditions to determine which measures are needed to prevent carbon monoxide from contaminating breathing air.

(i)(7) Compressors that are oil lubricated. With this type of compressor, carbon monoxide can be generated when oil enters the combustion chamber and is partially combusted. Therefore, you must ensure that the compressor operates with a carbon monoxide alarm or a high-temperature alarm.

Carbon monoxide alarms provide better protection than high-temperature alarms because the high-temperature alarms only detect carbon monoxide generated in the combustion chamber, and

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not carbon monoxide resulting from a poorly located compressor intake. Furthermore, high-temperature alarms are installed more for the purpose of protecting the compressor from damage than guarding employees from exposure to carbon monoxide. Because of this, the alarm component of the system is often located with the alarm sensor, where it may not be heard by the respirator users. Consequently, if the compressor has only a high-temperature alarm, you must ensure that air quality is frequently monitored to confirm that carbon monoxide levels stay below 10 ppm.

How often should I check on carbon monoxide levels?

Periodic monitoring for carbon monoxide is acceptable when using newer, well-maintained compressors. Continuous monitoring, however, is recommended for older compressors. In older equipment, oil may enter the air supply more readily due to piston ring or cylinder wear. Continuous monitoring also should be conducted for rented or second-hand compressors because the maintenance history is likely to be unknown or uncertain.

How do I check carbon monoxide levels?

Carbon monoxide levels can be tested with two general types of devices:

- # Direct reading instruments that use electrochemical sensors
- # Chemical detector tubes

Although the electrochemical devices tend to be more expensive, they are also more accurate (i.e., they have a 5 percent error rate). Also, such devices must be calibrated periodically (usually monthly) to achieve accurate readings. Chemical detector tubes have a higher error rate of 10 to 15 percent. Carbon monoxide filters (i.e., filters that convert carbon monoxide to carbon dioxide) with color-change indicators may not be used as carbon monoxide monitors because the color change indicates the presence of moisture, not carbon monoxide.

(i)(8) PRECAUTIONS REGARDING COUPLINGS

You must ensure that couplings used on airlines for atmosphere-supplying respirators are *incompatible* with outlets for nonbreathable worksite air or other gas systems. This precaution must be taken to avoid the chance of inadvertently connecting a respirator to a source other than

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the breathing air. Such a mistake could result in serious illness or death.

Also, you must ensure that at no time is an asphyxiating substance introduced into a respirator's airlines. For example, an inert gas such as nitrogen must not be used to purge or clean breathing airlines.

(i)(9) LABELING OF BREATHING GAS CONTAINERS

You must ensure that breathing air containers are labeled in keeping with the NIOSH respirator certification standard (42 CFR 84). The NIOSH standard incorporates ANSI's Method of Marking Portable Compressed Gas Containers to Identify Material Contained (Z48.1-1971). Proper labeling of containers will avoid the possibility of confusion when connecting the breathing air source to the respirator.

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CHECKLIST FOR BREATHING AIR QUALITY AND USE

Check that at your facility:

General

- Γ Compressed breathing air meets the requirements for Grade D breathing air.
- Γ Compressed oxygen is not used in respirators that have previously used compressed air.
- Γ Oxygen concentrations greater than 23.5 percent are used only in equipment designed for oxygen service or distribution.
- Γ Breathing air couplings are incompatible with outlets for other gas systems.
- Γ Breathing gas containers are marked with appropriate NIOSH certification.

Breathing Air Cylinders

- Γ Cylinders are tested and maintained according to DOT 49 CFR Part 173 and 178.
- Γ A certificate of analysis for breathing air has been obtained from the supplier.
- Γ Moisture content in the cylinder does not exceed a dew point of -50° F at 1 atmosphere pressure.

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CHECKLIST FOR BREATHING AIR QUALITY AND USE (cont.)

Compressors

- Γ Are constructed and situated to prevent contaminated air from getting into the system.
- Γ Are set up to minimize the moisture content.
- Γ Are equipped with in-line air-purifying sorbent beds and/or filters that are maintained or replaced following manufacturer's instructions.
- Γ Are tagged with information on the most recent change date of the filter and an authorizing signature.
- Γ Carbon monoxide does not exceed 10 ppm in the breathing air from compressors that are not oil-lubricated.
- Γ High-temperature and carbon monoxide alarms are used on oil-lubricated compressors, or that the air is monitored often enough to ensure that carbon monoxide does not exceed 10 ppm if only a high-temperature alarm is used.

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Section(j): IDENTIFICATION OF FILTERS, CARTRIDGES AND CANISTERS

This section of the standard requires you to ensure that all filters, cartridges and canisters used are labeled and color coded with the NIOSH approval label. You must also ensure that the label is not removed and remains legible.

To fulfill these requirements, you should adopt appropriate procedures for ensuring that:

- # Only NIOSH-approved filters, cartridges, and canisters are used
- # Labels are not removed, defaced, or obscured during respirator usage

These procedures may be included in your written respiratory protection program.

What is included on the NIOSH label?

The label clearly states the class of contaminants for which the filter, cartridge, or canister may be used (e.g., permissible particulate respirator filter for dusts, fumes and mists, including asbestos containing dusts and mists and radionuclides). The NIOSH approval number, and any limitations or precautions are also included on the label.

What is the purpose of the label?

The NIOSH label serves several purposes. It ensures selection of the appropriate cartridge/canister for the contaminants found in the workplace. Also, it permits the employee using the respirator to check and confirm that the respirator has the appropriate filters before the respirator is used. Further, the color coding scheme allows fellow employees, supervisors, and the respiratory protection program administrator to readily determine that the employee is using the appropriate filter.

Can I write the date of initial use on the label?

Yes. Marking the initial use date on the label can be done in a way that does not obscure the information on the label.

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Section (k): TRAINING AND INFORMATION

Employee training is a critical part of a successful respiratory protection program and is essential for correct respirator use. You must provide training to your employees who are required to wear respirators.

(k)(1) CONTENT OF TRAINING

You must ensure that each employee can demonstrate knowledge of at least the following:

- # **Why the respirator is necessary and how improper fit, usage, and maintenance can make the respirator ineffective.**

Training must address the identification of hazards, the extent of employee exposure to those hazards, and the potential health effects of exposure. The training that is required under the Hazard Communication standard (29 CFR 1910.1200) can satisfy this requirement for chemical hazards. Employees must understand that proper fit, usage, and maintenance of respirators is critical to ensure that they can perform their protective function.

- # **What the limitations and capabilities of the selected respirator are.**

Training must cover how the respirator operates. Included must be an explanation of how the respirator provides protection by filtering the air, absorbing the gas or vapor, or by supplying a clean source of air. Limitations on the use of the equipment, such as prohibitions against using an air-purifying respirator in an IDLH atmosphere, and why not, must also be explained.

- # **How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.**

Training must address the possibility of respirator malfunction and the development of emergency situations specific to the worksite. Employees must understand what procedures are to be followed in such circumstances, and which procedures require use of a different respirator.

- # **How to inspect, put on and remove, and check the seals of the respirator.**

You must train employees how to recognize problems that may decrease the effectiveness of the respirator and what steps to follow if a problem is detected, such as the person to whom problems should be reported and where replacement equipment can be obtained if

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needed. If specialized personnel conduct inspections, individual respirator wearers only need to be taught about the portions of the inspection process that are their responsibility. You must also cover how to properly put on and remove the respirator to ensure that respirator fit in the workplace is as close as possible to the fit obtained during fit testing. Employees must be trained to perform user seal checks (see Appendix B-1 of the standard in Appendix I of this document).

What the respirator maintenance and storage procedures are.

The extent of training required may vary according to workplace conditions. If employees are individually responsible for storing and maintaining respirators, detailed training may be necessary. If specialized personnel perform these functions, employees only need to be informed of the maintenance and storage procedures.

How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.

You must instruct employees to recognize medical signs and symptoms, such as shortness of breath or dizziness, that may limit or prevent effective use of respirators. Examples of medical conditions and signs and symptoms that may affect an employee's ability to use a respirator are described in Appendix C of the standard in Appendix I of this document.

The general requirements of the Respiratory Protection standard.

You must ensure that employees are aware, in general, of your obligations under the standard. This discussion need not focus on the standard's provisions but could, for example, simply inform employees that employers are obligated to develop a written program, properly select respirators, evaluate respirator use, correct deficiencies in respirator use, conduct medical evaluations, provide for the maintenance, storage and cleaning of respirators, and retain and provide access to specific records.

Do I Need to Follow a Particular Format?

No. As long as the required topics are addressed, you can use whatever training method is effective. Prepared materials, such as audiovisual and slide presentations, formal classroom instruction, informal discussions during safety meetings, training programs developed or conducted by unions or respirator manufacturers, or a combination of these methods may be used.

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In what sense are employees expected to be able to “demonstrate knowledge” of proper respirator use based on the training?

You must ensure that, before an employee is required to use a respirator in the workplace, he or she understands the information provided and can use the respirator properly. This can be done by reviewing the training with the employee either orally or in writing, and by reviewing the employee's hands-on use of respirators.

(k)(2) COMPREHENSION OF TRAINING

Training must be conducted in a manner that is understandable to your employees. This means that your program should be tailored to your employees' education level and language background.

(k)(3) TIMING OF TRAINING

You must provide the required training prior to requiring an employee to use a respirator in the workplace.

(k)(4) PORTABILITY OF TRAINING

If you can demonstrate that a new employee has received training within the last 12 months and can demonstrate the necessary knowledge, you are not required to repeat this training. In cases where training in some elements is lacking or inadequate, you are required to provide training in those elements. Previous training not repeated initially must be provided no later than 12 months from the date of the previous training.

(k)(5) RETRAINING

You must retrain employees in the proper use of respirators annually. You must also retrain employees when:

- # Changes in the workplace or the type of respirator make previous training obsolete.
- # The knowledge and skill necessary to use the respirator properly has not been retained by the employee.
- # Any other situation arises in which retraining appears necessary to ensure safe respirator

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use.

(k)(6) INFORMATION FOR VOLUNTARY RESPIRATOR USERS

For employees who choose to wear a respirator but are not required to do so, you are only required to provide the advisory information in Appendix D of the standard. This basic information on the proper use of respirators can be presented to the employee either verbally or in written form. Training is not required for employees who are not required to wear respirators, i.e., for employees who are wearing respirators voluntarily.

TRAINING AND INFORMATION CHECKLIST

Check that at your facility:

- Γ Employees can demonstrate knowledge of:
 - Γ Why the respirator is necessary and the consequences of improper fit, use, or maintenance.
 - Γ Limitations and capabilities of the respirator.
 - Γ How to effectively use the respirator in emergency situations.
 - Γ How to inspect, put on, remove, use, and check the seals of the respirator.
 - Γ Maintenance and storage procedures.
 - Γ The general requirements of the respirator standard.
- Γ Training is understandable to employees.
- Γ Training is provided prior to employee use of a respirator.
- Γ Retraining is provided:
 - Γ Annually.
 - Γ Upon changes in workplace conditions that affect respirator use.
 - Γ Whenever retraining appears necessary to ensure safe respirator use.
- Γ Appendix D of the standard is provided to voluntary users.

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Section (I): PROGRAM EVALUATION

(I)(1) CONDUCTING PROGRAM EVALUATIONS

You must perform evaluations of the workplace as necessary to make sure that your written respiratory protection program is working effectively.

How often do I need to evaluate my written respiratory protection program?

You do not need to review your respiratory protection program according to any fixed schedule. The frequency with which you need to evaluate your respiratory protection program will depend on the complexity and/or variability of the program and factors such as:

- # The type and extent of hazards in your workplace.
- # The types of respirators used by your employees.
- # The number of your employees who use respirators.
- # The amount of experience your respirator-wearing employees have in using respirators.

You must evaluate respirator use with sufficient frequency to ensure that all elements of the respiratory protection program are being effectively implemented.

(I)(2) CONSULTING WITH EMPLOYEES

You must regularly consult with employees required to wear respirators to assess their views on the effectiveness of the respiratory protection program and to identify any problems that they may be encountering with the use of respirators. You must correct any problems that are identified. At a minimum, you must assess:

- # Whether proper fit of respirators is being achieved, and whether respirator use is interfering with effective work performance.
- # Whether appropriate respirators have been selected.
- # Whether respirators are being properly used.

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- # Whether respirators are being properly maintained.

When I consult with my employees, what should I ask them?

You may want to ask your employees questions such as:

- # Does your respirator interfere with your hearing or vision?
- # Do you experience fatigue or have difficulty breathing during respirator use?
- # Does your respirator restrict your movements or interfere with your job performance in any way?
- # Is your respirator uncomfortable?
- # Are you confident that you are using your respirator correctly?
- # Are you confident that your respirator is performing adequately?

PROGRAM EVALUATION CHECKLIST

Check that at your facility:

- 9 Workplace evaluations are being conducted as necessary to ensure that the written respiratory protection program is being effectively implemented.
- 9 Employees required to wear respirators are being regularly consulted to assess the employees' views and to identify problems with respirator fit, selection, use and maintenance.
- 9 Any problems identified during assessments are corrected.

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Section (m): RECORDKEEPING

To assist you in auditing the adequacy of your respiratory protection program, to facilitate employee involvement, and to provide a record for compliance determinations by OSHA, you must retain certain records.

(m)(1) MEDICAL EVALUATION RECORDS

Records of medical evaluations required by the standard and described in section (e) of this guide must be retained and made available to the affected employees in accordance with OSHA's Access to Employee Exposure and Medical Records standard (29 CFR 1910.1020).

(m)(2) RESPIRATOR FIT TESTING RECORDS

You are required to retain written records of the qualitative and quantitative fit tests administered to your employees. These records need to include:

- # The name or identification of the employee tested.
- # The type of fit test performed.
- # The make, model, and size of the respirator tested.
- # The date of the fit test.
- # Pass/fail results if a qualitative fit test (QLFT) is used, or the fit factor and strip chart recording or other record of the test results if a quantitative fit test (QNFT) is used.

How long do I need to retain fit test records?

Fit test records must be retained for respirator users until the next fit test is administered.

Do I need to retain records of fit tests for employees who are no longer using respirators?

No. Fit test records do not need to be retained for these employees.

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(m)(3) WRITTEN RESPIRATORY PROTECTION PROGRAM

You must retain a written copy of your current respiratory protection program.

(m)(4) ACCESS TO RECORDS

Written materials required to be retained must be made available upon request to the affected employees, their designated representatives, and to OSHA. See 29 CFR 1910.1020 for more information.

Do I need to allow employees and OSHA to make copies of these materials?

Yes. You need to make these materials available for inspection and for copying.

Must employees be allowed access to the records of other employees?

No. Each affected employee can have access to his or her records only.

RECORDKEEPING CHECKLIST

Check that at your facility:

- ☐ Records of medical evaluations have been retained.
- ☐ Fit testing records have been retained.
- ☐ A copy of the current respiratory protection program has been retained.
- ☐ Access to these records is provided to affected employees.

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Section (n): DATES

This portion of the Respiratory Protection standard sets forth the dates by which you must meet the requirements of the revised Respiratory Protection standard.

(n)(1) EFFECTIVE DATE

The revised Respiratory Protection standard became effective on October 5, 1998.

(n)(4) EXISTING RESPIRATORY PROTECTION PROGRAMS

You may use the results of training, fit testing, or program or medical evaluations conducted within twelve months prior to April 8, 1998 to comply with the revised Respiratory Protection standard, if the results meet the requirements of the standard.

APPENDIX I

Respiratory Protection Standard (29 CFR 1910.134)

Shipyards (29 CFR 1915.154)

Marine Terminals (29 CFR 1917.92)

Longshoring (29 CFR 1918.102)

Construction (29 CFR 1926.103)

See Separate Documents



OSHA Regulations (Standards - 29 CFR) Respiratory Protection. - 1910.134



[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134
- **Standard Title:** Respiratory Protection.
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Interpretation(s)

This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Longshoring (part 1918), and Construction (part 1926).

..1910.134(a)

(a)

Permissible practice.

(a)(1)

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(a)(2)

Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in paragraph (c) of this section.

..1910.134(b)

(b)

Definitions. The following definitions are important terms used in the respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF) [Reserved]

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation

beyond the incipient stage. (See 29 CFR 1910.155)

Loose-fitting facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) [Reserved].

Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

This section means this respiratory protection standard.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c)

Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(c)(1)

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(c)(1)(i)

Procedures for selecting respirators for use in the workplace;

(c)(1)(ii)

Medical evaluations of employees required to use respirators;

(c)(1)(iii)

Fit testing procedures for tight-fitting respirators;

(c)(1)(iv)

Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(c)(1)(v)

Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(c)(1)(vi)

Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(c)(1)(vii)

Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

..1910.134(c)(1)(viii)

(c)(1)(viii)

Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(c)(1)(ix)

Procedures for regularly evaluating the effectiveness of the program.

(c)(2)

Where respirator use is not required:

(c)(2)(i)

An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and

(c)(2)(ii)

In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(c)(3)

The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(c)(4)

The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

(d)

Selection of respirators. This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(d)(1)

General requirements.

(d)(1)(i)

(i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(d)(1)(ii)

The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(d)(1)(iii)

The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

..1910.134(d)(1)(iv)

(d)(1)(iv)

The employer shall select respirators from a sufficient number of respirator models and

sizes so that the respirator is acceptable to, and correctly fits, the user.

(d)(2)

Respirators for IDLH atmospheres.

(d)(2)(i)

The employer shall provide the following respirators for employee use in IDLH atmospheres:

(d)(2)(i)(A)

A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(d)(2)(i)(B)

A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(d)(2)(ii)

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(d)(2)(iii)

All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(d)(3)

Respirators for atmospheres that are not IDLH.

(d)(3)(i)

The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(d)(3)(i)(A)

Assigned Protection Factors (APFs) [Reserved]

(d)(3)(i)(B)

Maximum Use Concentration (MUC) [Reserved]

(d)(3)(ii)

The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(d)(3)(iii)

For protection against gases and vapors, the employer shall provide:

(d)(3)(iii)(A)

An atmosphere-supplying respirator, or

(d)(3)(iii)(B)

An air-purifying respirator, provided that:

(d)(3)(iii)(B)(1)

(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by

NIOSH for the contaminant; or

(d)(3)(iii)(B)(2)

If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(d)(3)(iv)

For protection against particulates, the employer shall provide:

(d)(3)(iv)(A)

An atmosphere-supplying respirator; or

(d)(3)(iv)(B)

An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(d)(3)(iv)(C)

For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I. -- Assigned Protection Factors [Reserved]

TABLE II	
Altitude (ft.)	Oxygen deficient Atmospheres (% O ₂) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.5-19.5
3,001-4,000	16.4-19.9
4,001-5,000	17.5-19.5
5,001-6,000	17.8-19.5
6,001-7,000	18.5-19.5
7,001-8,000*	19.3-19.5

* Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

..1910.134(e)

(e)

Medical evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(e)(1)

General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical

evaluations when the employee is no longer required to use a respirator.

(e)(2)

Medical evaluation procedures.

(e)(2)(i)

The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(e)(2)(ii)

The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.

(e)(3)

Follow-up medical examination.

(e)(3)(i)

The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(e)(3)(ii)

The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(e)(4)

Administration of the medical questionnaire and examinations.

(e)(4)(i)

The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(e)(4)(ii)

The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(e)(5)

Supplemental information for the PLHCP.

(e)(5)(i)

The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(e)(5)(i)(A)

(A) The type and weight of the respirator to be used by the employee;

(e)(5)(i)(B)

The duration and frequency of respirator use (including use for rescue and escape);

(e)(5)(i)(C)

The expected physical work effort;

(e)(5)(i)(D)

Additional protective clothing and equipment to be worn; and

(e)(5)(i)(E)

Temperature and humidity extremes that may be encountered.

(e)(5)(ii)

Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(e)(5)(iii)

The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(e)(6)

Medical determination. In determining the employee's ability to use a respirator, the employer shall:

(e)(6)(i)

Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(e)(6)(i)(A)

Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(e)(6)(i)(B)

The need, if any, for follow-up medical evaluations; and

(e)(6)(i)(C)

A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(e)(6)(ii)

If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(e)(7)

Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

(e)(7)(i)

An employee reports medical signs or symptoms that are related to ability to use a respirator;

(e)(7)(ii)

A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(e)(7)(iii)

Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation;
or

(e)(7)(iv)

A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f)

Fit testing. This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(f)(1)

The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(f)(2)

The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(f)(3)

The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(f)(4)

If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

..1910.134(f)(5)

(f)(5)

The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.

(f)(6)

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

(f)(7)

If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(f)(8)

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(f)(1)(8)(i)

Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(f)(1)(8)(ii)

Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(f)(1)(8)(iii)

Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g)

Use of respirators. This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(g)(1)

Facepiece seal protection.

(g)(1)(i)

The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(g)(1)(i)(A)

Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(g)(1)(i)(B)

Any condition that interferes with the face-to-facepiece seal or valve function.

(g)(1)(ii)

If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(g)(1)(iii)

For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(g)(2)

Continuing respirator effectiveness.

(g)(2)(i)

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(g)(2)(ii)

The employer shall ensure that employees leave the respirator use area:

..1910.134(g)(2)(ii)(A)

(g)(2)(ii)(A)

To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(g)(2)(ii)(B)

If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(g)(2)(ii)(C)

To replace the respirator or the filter, cartridge, or canister elements.

(g)(2)(iii)

If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(g)(3)

Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

(g)(3)(i)

One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(g)(3)(ii)

Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(g)(3)(iii)

The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(g)(3)(iv)

The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(g)(3)(v)

The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(g)(3)(vi)

Employee(s) located outside the IDLH atmospheres are equipped with:

(g)(3)(vi)(A)

Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(g)(3)(vi)(B)

Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

(g)(3)(vi)(C)

Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(g)(4)

Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

(g)(4)(i)

At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(g)(4)(ii)

At least two employees are located outside the IDLH atmosphere; and

(g)(4)(iii)

All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h)

(h) ***Maintenance and care of respirators.*** This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(h)(1)

Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(h)(1)(i)

Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(h)(1)(ii)

Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(h)(1)(iii)

Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(h)(1)(iv)

Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(h)(2)

Storage. The employer shall ensure that respirators are stored as follows:

(h)(2)(i)

All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(h)(2)(ii)

In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(h)(2)(ii)(A)

Kept accessible to the work area;

(h)(2)(ii)(B)

Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(h)(2)(ii)(C)

Stored in accordance with any applicable manufacturer instructions.

..1910.134(h)(3)

(h)(3)

Inspection.

(h)(3)(i)

The employer shall ensure that respirators are inspected as follows:

(h)(3)(i)(A)

All respirators used in routine situations shall be inspected before each use and during cleaning;

(h)(3)(i)(B)

All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(h)(3)(i)(C)

Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(h)(3)(ii)

The employer shall ensure that respirator inspections include the following:

(h)(3)(ii)(A)

A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(h)(3)(ii)(B)

A check of elastomeric parts for pliability and signs of deterioration.

(h)(3)(iii)

In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(h)(3)(iv)

For respirators maintained for emergency use, the employer shall:

(h)(3)(iv)(A)

Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and (B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(h)(4)

Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(h)(4)(i)

Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(h)(4)(ii)

Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(h)(4)(iii)

Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i)

Breathing air quality and use. This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(i)(1)

The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i)(1)(i)

Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

..1910.134(i)(1)(ii)

(i)(1)(ii)

Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

(i)(1)(ii)(A)

Oxygen content (v/v) of 19.5-23.5%;

(i)(1)(ii)(B)

Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(i)(1)(ii)(C)

Carbon monoxide (CO) content of 10 ppm or less;

(i)(1)(ii)(D)

Carbon dioxide content of 1,000 ppm or less; and

(i)(1)(ii)(E)

Lack of noticeable odor.

(i)(2)

The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(i)(3)

The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(i)(4)

The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i)(4)(i)

Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);

(i)(4)(ii)

Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(i)(4)(iii)

The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

(i)(5)

The employer shall ensure that compressors used to supply breathing air to respirators

are constructed and situated so as to:

(i)(5)(i)

Prevent entry of contaminated air into the air-supply system;

(i)(5)(ii)

Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;

(i)(5)(iii)

Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(i)(5)(iv)

Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(i)(6)

For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(i)(7)

For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(i)(8)

The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(i)(9)

The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

(j)

Identification of filters, cartridges, and canisters. The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

(k)

Training and information. This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(k)(1)

The employer shall ensure that each employee can demonstrate knowledge of at least the following:

..1910.134(k)(1)(i)

(k)(1)(i)

Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(k)(1)(ii)

What the limitations and capabilities of the respirator are;

(k)(1)(iii)

How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(k)(1)(iv)

How to inspect, put on and remove, use, and check the seals of the respirator;

(k)(1)(v)

What the procedures are for maintenance and storage of the respirator;

(k)(1)(vi)

How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(k)(1)(vii)

The general requirements of this section.

(k)(2)

The training shall be conducted in a manner that is understandable to the employee.

(k)(3)

The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(k)(4)

An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(k)(5)

Retraining shall be administered annually, and when the following situations occur:

(k)(5)(i)

Changes in the workplace or the type of respirator render previous training obsolete;

(k)(5)(ii)

Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(k)(5)(iii)

Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(k)(6)

The basic advisory information on respirators, as presented in Appendix D of this

section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(I)

Program evaluation. This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(I)(1)

The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(I)(2)

The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

..1910.134(I)(2)(i)

(I)(2)(i)

Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(I)(2)(ii)

Appropriate respirator selection for the hazards to which the employee is exposed;

(I)(2)(iii)

Proper respirator use under the workplace conditions the employee encounters; and

(I)(2)(iv)

Proper respirator maintenance.

(m)

Recordkeeping. This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

..1910.134(m)(1)

(m)(1)

Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(m)(2)

Fit testing.

(m)(2)(i)

The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

(m)(2)(i)(A)

The name or identification of the employee tested;

(m)(2)(i)(B)

Type of fit test performed;

(m)(2)(i)(C)

Specific make, model, style, and size of respirator tested;

(m)(2)(i)(D)

Date of test; and

(m)(2)(i)(E)

The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(m)(2)(ii)

Fit test records shall be retained for respirator users until the next fit test is administered.

(m)(3)

A written copy of the current respirator program shall be retained by the employer.

(m)(4)

Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n)

Dates.

(n)(1)

Effective date. This section is effective April 8, 1998. The obligations imposed by this section commence on the effective date unless otherwise noted in this paragraph. Compliance with obligations that do not commence on the effective date shall occur no later than the applicable start-up date.

(n)(2)

Compliance dates. All obligations of this section commence on the effective date except as follows:

..1910.134(n)(2)(i)

(n)(2)(i)

The determination that respirator use is required (paragraph (a)) shall be completed no later than September 8, 1998.

(n)(2)(ii)

Compliance with provisions of this section for all other provisions shall be completed no later than October 5, 1998.

(n)(3)

The provisions of 29 CFR 1910.134 and 29 CFR 1926.103, contained in the 29 CFR parts 1900 to 1910.99 and the 29 CFR part 1926 editions, revised as of July 1, 1997, are in effect and enforceable until October 5, 1998, or during any administrative or judicial stay of the provisions of this section.

(n)(4)

Existing Respiratory Protection Programs. If, in the 12 month period preceding April 8, 1998, the employer has conducted annual respirator training, fit testing, respirator program evaluation, or medical evaluations, the employer may use the results of those activities to comply with the corresponding provisions of this section, providing that these activities were conducted in a manner that meets the requirements of this section.

..1910.134(o)

(o)

Appendices.

(o)(1)

Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C of this section is mandatory.

(o)(2)

Appendix D of this section is non-mandatory and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]




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OSHA Regulations (Standards - 29 CFR)

Fit Testing Procedures (Mandatory). - 1910.134 App A

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- **Standard Number:** 1910.134 App A
- **Standard Title:** Fit Testing Procedures (Mandatory).
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Appendix A to § 1910.134: Fit Testing Procedures (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures -- General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is

donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

- (a) Position of the mask on the nose
- (b) Room for eye protection
- (c) Room to talk
- (d) Position of mask on face and cheeks

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

- (a) Chin properly placed;
- (b) Adequate strap tension, not overly tightened;
- (c) Fit across nose bridge;
- (d) Respirator of proper size to span distance from nose to chin;
- (e) Tendency of respirator to slip;
- (f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a

different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises. (a) The following test exercises are to be performed for all fit testing methods prescribed in this appendix, except for the CNP method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist. (8) Normal breathing. Same as exercise (1).

(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or

ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a 3/4-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken

dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Saccharin solution aerosol fit test procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure described in 3. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. BitrexTM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a $\frac{3}{4}$ inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is

completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Bitrex Solution Aerosol Fit Test Procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure as that described in 4. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

(8) After generating the aerosol, the test subject shall be

instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing

instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

(a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

(a) Apparatus.

(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

(2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

(4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.

(6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is

allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1/4 inch.

(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

(8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.

(9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.

(12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(13) The limitations of instrument detection shall be taken into account when determining the fit factor.

(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

(4) Immediately after the subject enters the test chamber, the

test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.

(8) Calculation of fit factors.

(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and

then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_6 + 1/ff_7 + 1/ff_8}$$

Where ff_1 , ff_2 , ff_3 , etc. are the fit factors for exercises 1, 2, 3, etc.

(9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.

(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (PortacountTM) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

(1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the

respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Dynatech Nevada also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing

in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at -- 15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

(Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

(5) The test subject shall be trained to hold his or her breath for at least 20 seconds.

(6) The test subject shall don the test respirator without any assistance from the individual who conducts the CNP fit test.

(7) The QNFT protocol shall be followed according to section I.

C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during

the test measurement.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

(4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.

(7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

(1) The test instrument shall have an effective audio warning

device when the test subject fails to hold his or her breath during the test. The test shall be terminated whenever the test subject failed to hold his or her breath. The test subject may be refitted and retested.

(2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

Part II. New Fit Test Protocols


A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or
2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

[63 FR 20098, April 23, 1998]

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OSHA Regulations (Standards - 29 CFR) User Seal Check Procedures (Mandatory). - 1910.134 App B-1



[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134 App B-1
- **Standard Title:** User Seal Check Procedures (Mandatory).
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Appendix B-1 to § 1910.134: User Seal Check Procedures (Mandatory)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

A. *Positive pressure check.* Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. *Negative pressure check.* Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

[63 FR 1152, Jan. 8, 1998]



[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)



OSHA Regulations (Standards - 29 CFR) Respiratory Cleaning Procedures (Mandatory). - 1910.134 App B-2



[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134 App B-2
- **Standard Title:** Respiratory Cleaning Procedures (Mandatory).
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Appendix B-2 to § 1910.134: Respirator Cleaning Procedures (Mandatory)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in Appendix B-2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure- demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or,
2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,
3. Other commercially available cleansers of equivalent disinfectant quality when used as

directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

[63 FR 1152, Jan. 8, 1998]



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OSHA Regulations (Standards - 29 CFR)

OSHA Respirator Medical Evaluation Questionnaire (Mandatory). - 1910.134 App C



[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134 App C
- **Standard Title:** OSHA Respirator Medical Evaluation Questionnaire (Mandatory).
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Appendix C to Sec. 1910.134: OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: _____ ft. _____ in.
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No

11. Check the type of respirator you will use (you can check more than one category):

- a. _____ N, R, or P disposable respirator (filter-mask, non- cartridge type only).
- b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

If "yes," what type(s): _____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you *ever had* any of the following conditions?

- a. Seizures (fits): Yes/No
- b. Diabetes (sugar disease): Yes/No
- c. Allergic reactions that interfere with your breathing: Yes/No
- d. Claustrophobia (fear of closed-in places): Yes/No
- e. Trouble smelling odors: Yes/No

3. Have you *ever had* any of the following pulmonary or lung problems?

- a. Asbestosis: Yes/No
- b. Asthma: Yes/No
- c. Chronic bronchitis: Yes/No
- d. Emphysema: Yes/No
- e. Pneumonia: Yes/No
- f. Tuberculosis: Yes/No
- g. Silicosis: Yes/No
- h. Pneumothorax (collapsed lung): Yes/No
- i. Lung cancer: Yes/No
- j. Broken ribs: Yes/No
- k. Any chest injuries or surgeries: Yes/No
- l. Any other lung problem that you've been told about: Yes/No

4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?

- a. Shortness of breath: Yes/No
- b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
- c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
- d. Have to stop for breath when walking at your own pace on level ground: Yes/No
- e. Shortness of breath when washing or dressing yourself: Yes/No
- f. Shortness of breath that interferes with your job: Yes/No

- g. Coughing that produces phlegm (thick sputum): Yes/No
- h. Coughing that wakes you early in the morning: Yes/No
- i. Coughing that occurs mostly when you are lying down: Yes/No
- j. Coughing up blood in the last month: Yes/No
- k. Wheezing: Yes/No
- l. Wheezing that interferes with your job: Yes/No
- m. Chest pain when you breathe deeply: Yes/No
- n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you *ever had* any of the following cardiovascular or heart problems?

- a. Heart attack: Yes/No
- b. Stroke: Yes/No
- c. Angina: Yes/No
- d. Heart failure: Yes/No
- e. Swelling in your legs or feet (not caused by walking): Yes/No
- f. Heart arrhythmia (heart beating irregularly): Yes/No
- g. High blood pressure: Yes/No
- h. Any other heart problem that you've been told about: Yes/No

6. Have you *ever had* any of the following cardiovascular or heart symptoms?

- a. Frequent pain or tightness in your chest: Yes/No
- b. Pain or tightness in your chest during physical activity: Yes/No
- c. Pain or tightness in your chest that interferes with your job: Yes/No
- d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
- e. Heartburn or indigestion that is not related to eating: Yes/ No
- f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you *currently* take medication for any of the following problems?

- a. Breathing or lung problems: Yes/No
- b. Heart trouble: Yes/No
- c. Blood pressure: Yes/No
- d. Seizures (fits): Yes/No

8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

- a. Eye irritation: Yes/No
- b. Skin allergies or rashes: Yes/No
- c. Anxiety: Yes/No
- d. General weakness or fatigue: Yes/No
- e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever lost* vision in either eye (temporarily or permanently): Yes/No

11. Do you *currently* have any of the following vision problems?

- a. Wear contact lenses: Yes/No

- b. Wear glasses: Yes/No
- c. Color blind: Yes/No
- d. Any other eye or vision problem: Yes/No

12. Have you *ever had* an injury to your ears, including a broken ear drum: Yes/No

13. Do you *currently* have any of the following hearing problems?

- a. Difficulty hearing: Yes/No
- b. Wear a hearing aid: Yes/No
- c. Any other hearing or ear problem: Yes/No

14. Have you *ever had* a back injury: Yes/No

15. Do you *currently* have any of the following musculoskeletal problems?

- a. Weakness in any of your arms, hands, legs, or feet: Yes/No
- b. Back pain: Yes/No
- c. Difficulty fully moving your arms and legs: Yes/No
- d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
- e. Difficulty fully moving your head up or down: Yes/No
- f. Difficulty fully moving your head side to side: Yes/No
- g. Difficulty bending at your knees: Yes/No
- h. Difficulty squatting to the ground: Yes/No
- i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
- j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If "yes," name the chemicals if you know them: _____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

- a. Asbestos: Yes/No
- b. Silica (e.g., in sandblasting): Yes/No
- c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
- d. Beryllium: Yes/No
- e. Aluminum: Yes/No
- f. Coal (for example, mining): Yes/No
- g. Iron: Yes/No
- h. Tin: Yes/No
- i. Dusty environments: Yes/No
- j. Any other hazardous exposures: Yes/No

If "yes," describe these exposures: _____

4. List any second jobs or side businesses you have: _____

5. List your previous occupations: _____

6. List your current and previous hobbies: _____

7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them: _____

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes/No

b. Canisters (for example, gas masks): Yes/No

c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:

a. Escape only (no rescue): Yes/No

b. Emergency rescue only: Yes/No

c. Less than 5 hours *per week*: Yes/No

d. Less than 2 hours *per day*: Yes/No

e. 2 to 4 hours per day: Yes/No

f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

a. *Light* (less than 200 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of a light work effort are *sitting* while writing, typing, drafting, or performing light assembly work; or *standing* while operating a drill press (1-3 lbs.) or controlling machines.

b. *Moderate* (200 to 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of moderate work effort are *sitting* while nailing or filing; *driving* a truck or bus in urban traffic; *standing* while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; *walking* on a level surface about 2 mph or down a 5-degree grade about 3 mph; or *pushing* a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. *Heavy* (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of heavy work are *lifting* a heavy load (about 50 lbs.) from the floor to your

waist or shoulder; working on a loading dock; *shoveling*; *standing* while bricklaying or chipping castings; *walking* up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No
If "yes," describe this protective clothing and/or equipment: _____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator:

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):


[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]



OSHA Regulations (Standards - 29 CFR) - Table of Contents



OSHA Regulations (Standards - 29 CFR) (Mandatory) Information for Employees Using Respirators When not Required Under Standard. - 1910.134 App D

 [OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134 App D
 - **Standard Title:** (Mandatory) Information for Employees Using Respirators When not Required Under Standard.
 - **SubPart Number:** I
 - **SubPart Title:** Personal Protective Equipment
-

Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.



OSHA Regulations (Standards - 29 CFR) - Table of Contents

APPENDIX II

OSHA Area and Regional Offices States With Consultation Programs and Approved OSHA Plans

OSHA AREA OFFICES (By state, in alphabetical order)

US Department of Labor - OSHA
2047 Canyon Road - Todd Mall
Birmingham, AL 35216
Telephone:(205) 731-1534

US Department of Labor - OSHA
3737 Government Blvd., Suite 100
Mobile, AL 36693
Telephone:(205) 441-6131

US Department of Labor - OSHA
301 W. Northern Lights Blvd.
Suite 407
Anchorage, AK 99503
Telephone:(907) 271-5152

US Department of Labor - OSHA
3221 North 16th Street, Suite 100
Phoenix, AZ 85016
Telephone:(602) 640-2007

US Department of Labor - OSHA
425 West Capitol
Suite 450
Little Rock, AR 72201
Telephone:(501) 324-6292

US Department of Labor - OSHA
71 Stevenson Street, Suite 415
San Francisco, CA 94105
Telephone:(415) 744-7120

US Department of Labor - OSHA
1391 North Speer Blvd.
Suite 210
Denver, CO 80204
Telephone:(303) 844-5285

US Department of Labor - OSHA
7935 E. Prentice Ave., Suite 209
Englewood, CO 80111-2714
Telephone:(303) 843-4500

US Department of Labor - OSHA

One Lafayette Square, Suite 202
Bridgeport, CT 06604
Telephone:(203) 579-5579

US Department of Labor - OSHA
Federal Office Building
450 Main Street, Room 508
Hartford, CT 06103
Telephone:(203) 240-3152

US Department of Labor - OSHA
Jacaranda Executive Court
8040 Peters Road
Building H-100
Fort Lauderdale, FL 33324
Telephone:(305) 424-0242

US Department of Labor - OSHA
Ribault Building
1851 Executive Center Drive
Suite 227
Jacksonville, FL 32207
Telephone:(904) 232-2895

US Department of Labor - OSHA
5807 Breckenridge Pkwy.
Suite A
Tampa, FL 33610
Telephone:(813) 626-1177

US Department of Labor - OSHA
450 Mall Blvd., Suite J
Savannah, GA 31406
Telephone:(912) 652-4393

US Department of Labor - OSHA
2400 Herodian Way, Suite 250
Smyrna, GA 30080
Telephone:(404) 984-8700

US Department of Labor - OSHA
Bldg. 7, Suite 110
La Vista Perimeter Office Park
Tucker, GA 30084
Telephone:(770) 493-6644

US Department of Labor - OSHA

300 Ala Moana Blvd., Suite 5122
Honolulu, HI 96850
Telephone:(808) 541-2685

US Department of Labor - OSHA
3050 N. Lakeharbor Lane
Suite 134
Boise, ID 83703
Telephone:(208) 334-1867

US Department of Labor - OSHA
1600 167th Street, Suite 12
Calumet City, IL 60409
Telephone:(708) 891-3800

US Department of Labor - OSHA
2360 E. Devon Avenue
Suite 1010
Des Plaines, IL 60018
Telephone:(708) 803-4800

US Department of Labor - OSHA
344 Smoke Tree Business Park
North Aurora, IL 60542
Telephone:(630) 803-896-8700

US Department of Labor - OSHA
2918 West Willow Knolls Road
Peoria, IL 61614
Telephone:(309) 671-7033

US Department of Labor - OSHA
46 East Ohio Street, Room 423
Indianapolis, IN 46204
Telephone:(317) 226-7290

US Department of Labor - OSHA
210 Walnut Street, Room 815
Des Moines, IA 50309
Telephone:(515) 284-4794

US Department of Labor - OSHA
300 Epic Center
301 N. Main
Wichita, KS 67202
Telephone:(316) 269-6644

US Department of Labor - OSHA
John C. Watts Fed. Bldg., Room 108
330 W. Broadway
Frankfort, KY 40601
Telephone:(502) 227-7024

US Department of Labor - OSHA
2156 Wooddale Blvd.
Hoover Annex, Suite 200
Baton Rouge, LA 70806
Telephone:(504) 389-0474

US Department of Labor - OSHA
U.S. Federal Building
202 Harlow Street,
Room 211
Bangor, ME 04401
Telephone:(207) 941-8177

US Department of Labor - OSHA
300 West Pratt Street
Suite 280
Baltimore, MD 21201
Telephone:(410) 962-2840

US Department of Labor - OSHA
639 Granite Street, 4th Floor
Braintree, MA 02184
Telephone:(617) 565-6924

US Department of Labor - OSHA
Valley Office Park
13 Branch Street
Methuen, MA 01844
Telephone:(617) 565-8110

US Department of Labor - OSHA
1145 Main Street, Room 108
Springfield, MA 01103-1493
Telephone:(413) 785-0123

US Department of Labor - OSHA
801 South Waverly Rd.
Suite 306
Lansing, MI 48917-4200
Telephone:(517) 377-1892

US Department of Labor - OSHA
Federal Courts Bldg.
110 South 4th Street, Room 116
Minneapolis, MN 55401
Telephone:(612) 348-1994

US Department of Labor - OSHA
3780 I-55 North
Suite 210
Jackson, MS 39211
Telephone:(601) 965-4606

US Department of Labor - OSHA
6200 Connecticut Avenue, Suite 100
Kansas City, MO 64120
Telephone:(816) 483-9531

US Department of Labor - OSHA
911 Washington Avenue
Room 420
St. Louis, MO 63101
Telephone:(314) 425-4249

US Department of Labor - OSHA
19 N. 25th Street
Billings, MT 59101
Telephone:(406) 657-6649

US Department of Labor - OSHA
Overland Wolf Bldg., Room 100
6910 Pacific Street
Omaha, NE 68106
Telephone:(402) 221-3182

US Department of Labor - OSHA
1050 East Williams, Suite 435
Carson City, NV 89701
Telephone:(702) 885-6963

US Department of Labor - OSHA
279 Pleasant Street, Suite 201
Concord, NH 03301
Telephone:(603) 225-1629

US Department of Labor - OSHA
1030 Saint Georges Ave.
Plaza 35, Suite 205

Avenel, NJ 07001
Telephone:(908) 750-3270

US Department of Labor - OSHA
500 Route 17 South, 2nd Floor
Hasbrouck Heights, NJ 07604
Telephone:(201) 288-1700

US Department of Labor - OSHA
Marlton Executive Park
701 Route 73 South Bldg. 2
Suite 120
Marlton, NJ 08053
Telephone:(609) 757-5181

US Department of Labor - OSHA
299 Cherry Hill Road, Suite 304
Parsippany, NJ 07054
Telephone:(201) 263-1003

US Department of Labor - OSHA
505 Marquette Avenue, NW
Suite 820
Albuquerque, NM 87102-2160
Telephone:(505) 248-5302

US Department of Labor - OSHA
401 New Karner Road
Suite 300
Albany, New York 12205-3809
Telephone:(518) 464-6742

US Department of Labor - OSHA
42-40 Bell Blvd. 5th Floor
Bayside, NY 11361
Telephone:(718) 279-9060

US Department of Labor - OSHA
5360 Genesee Street
Bowmansville, NY 14026
Telephone:(716) 684-3891

US Department of Labor - OSHA
90 Church Street, Room 1407
New York, NY 10007
Telephone:(212) 264-9840

US Department of Labor - OSHA
3300 Vikery Road, North New
Syracuse, NY 13212
Telephone:(315) 451-0808

US Department of Labor - OSHA
660 White Plains Road
4th Floor
Tarrytown, NY 10591-5107
Telephone:(914) 524-7510

US Department of Labor - OSHA
990 Westbury Road
Westbury, NY 11590
Telephone:(516) 334-3344

US Department of Labor - OSHA
Century Station, Room 438
300 Fayetteville Street Mall
Raleigh, NC 27601
Telephone:(919) 856-4770

US Department of Labor - OSHA
220 E. Rosser, Room 348
P.O. Box 2439
Bismarck, ND 58501
Telephone:(701) 250-4521

US Department of Labor - OSHA
36 Triangle Park Drive
Cincinnati, OH 45246
Telephone:(513) 841-4132

US Department of Labor - OSHA
Federal Office Building, Room 899
1240 East Ninth Street
Cleveland, OH 44199
Telephone:(216) 522-3818

US Department of Labor - OSHA
Federal Office Bldg., Room 620
200 N. High Street
Columbus, OH 43215
Telephone:(614) 469-5582

US Department of Labor - OSHA
Federal Office Bldg., Room 734

234 North Summit Street
Toledo, OH 43604
Telephone:(419) 259-7542

US Department of Labor - OSHA
420 West Main Place, Suite 300
Oklahoma City, OK 73102
Telephone:(405) 231-5351

US Department of Labor - OSHA
1220 S.W. Third Avenue, Room 640
Portland, OR 97294
Telephone:(503) 326-2251

US Department of Labor - OSHA
850 N. 5th Street
Allentown, PA 18102
Telephone:(610) 776-0592

US Department of Labor - OSHA
3939 West Ridge Road
Suite B-12
Erie, PA 16506-1857
Telephone:(814) 833-5758

US Department of Labor - OSHA
Progress Plaza
49 N. Progress Street
Harrisburg, PA 17109
Telephone:(717) 782-3902

US Department of Labor - OSHA
U.S. Custom House, Room 242
Second and Chestnut Street
Philadelphia, PA 19106
Telephone:(215) 597-4955

US Department of Labor - OSHA
Federal Building, Room 1428
1000 Liberty Avenue
Pittsburgh, PA 15222
Telephone:(412) 644-2903

US Department of Labor - OSHA
Penn Place, Room 2005
20 North Pennsylvania Avenue
Wilkes-Barre, PA 18701

Telephone:(717) 826-6538

US Department of Labor - OSHA
BBV Plaza Building, Suite 5B
1510 F.D. Roosevelt Avenue
Guaynabo, PR 00968
Telephone: (787) 277-1560
Telephone:(809) 766-5457

US Department of Labor - OSHA
380 Westminster Mall, Room 243
Providence, RI 02903
Telephone:(401) 528-4669

US Department of Labor - OSHA
1835 Assembly Street, Room 1468
Columbia, SC 29201
Telephone:(803) 765-5904

US Department of Labor - OSHA
2002 Richard Jones Road
Suite C-205
Nashville, TN 37215
Telephone:(615) 781-5423

US Department of Labor - OSHA
903 San Jacinto Blvd.
Suite 319
Austin, TX 78701
Telephone:(512) 916-5783

US Department of Labor - OSHA
Wilson Plaza
606 N. Carancahua, Suite 700
Corpus Christi, TX 78476
Telephone:(512) 884-2694

US Department of Labor - OSHA
8344 East R.L. Thornton Freeway
Suite 420
Dallas, TX 75228
Telephone:(214) 320-2400

US Department of Labor - OSHA
North Star 2 Building
Suite 430
8713 Airport Freeway

Fort Worth, TX 76180-7604
Telephone:(817) 885-7025

US Department of Labor - OSHA
17625 El Camino Real, Suite 400
Houston, TX 77058
Telephone:(713) 286-0583

US Department of Labor - OSHA
350 North Sam Houston Parkway
Suite 120
Houston, TX 77058
Telephone:(713) 591-2438

US Department of Labor - OSHA
Federal Building, Room 422
1205 Texas Avenue
Lubbock, TX 79401
Telephone:(806) 743-7681

US Department of Labor - OSHA
1781 South 300 West
Salt Lake City, UT 84165-0200
Telephone:(801) 524-5080

US Department of Labor - OSHA
AFOB, Room 835
200 Granby Mall
Norfolk, VA 23510
Telephone:(804) 441-3820

US Department of Labor - OSHA
505 16th Avenue, N.E.
Bellevue, WA 98004
Telephone:(206) 553-7520

US Department of Labor - OSHA
550 Eagan Street, Room 206
Charleston, WV 25301
Telephone:(304) 347-5937

US Department of Labor - OSHA
2618 North Ballard Road
Appleton, WI 54915
Telephone:(414) 734-4521

US Department of Labor - OSHA

4802 East Broadway
Madison, WI 53716
Telephone:(608) 264-5388

US Department of Labor - OSHA
Henry S. Reuss Bldg.
Suite 1180
310 West Wisconsin Ave.
Milwaukee, WI 53203
Telephone:(414) 297-3315

OSHA REGIONAL OFFICES

U.S. Department of Labor Occupational Safety and Health Administration Regional Offices

Region I
(CT,* MA, ME, NH, RI, VT*)
133 Portland Street
1st Floor
Boston, MA 02114
Telephone: (617) 565-9860

Region II
(NJ, NY,* PR,* VI*)
201 Varick Street
Room 670
New York, NY 10014
Telephone: (212) 337-2378

Region III
(DC, DE, MD,* PA, VA,* WV)
Gateway Building, Suite 2100
3535 Market Street
Philadelphia, PA 19104
Telephone: (215) 596-1201

Region IV
(AL, FL, GA, KY,* MS, NC, SC,* TN*)
1375 Peachtree Street, N.E.
Suite 587
Atlanta, GA 30367
Telephone: (404) 347-3573

Region V

(IL, IN,* MI,* MN,* OH, WI)

230 South Dearborn Street

Room 3244

Chicago, IL 60604

Telephone: (312) 353-2220

Region VI

(AR, LA, NM,* OK, TX)

525 Griffin Street

Room 602

Dallas, TX 75202

Telephone: (214) 767-4731

Region VII

(IA,* KS, MO, NE)

City Center Square

1100 Main Street, Suite 800

Kansas City, MO 64105

Telephone: (816) 426-5861

Region VIII**(CO, MT, ND, SD, UT,* WY*)**

1999 Broadway, Suite 1690

Denver, CO 80202-5716

Telephone: (303) 844-1600

Region IX**(American Samoa, AZ,* CA,* Guam,****HI,* NV,* Trust Territories of the Pacific)**

71 Stevenson Street

Room 420

San Francisco, CA 94105

Telephone: (415) 975-4310

Region X**(AK,* ID, OR,* WA*)**

1111 Third Avenue

Suite 715

Seattle, WA 98101-3212

Telephone: (206) 553-5930

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.

States With Consultation Programs and Approved OSHA Plans

States With Consultation Programs

ALABAMA

Safe State Program
University of Alabama
432 Martha Parham West
PO Box 870388
Tuscaloosa, Alabama 35487
(205) 348-3033 Fax: (205) 348-3049

ALASKA

ADOL/OSHA Division of Consultation
3301 Eagle Street
P.O. Box 107022
Anchorage, Alaska 99510
(907) 269-4957 Fax: (907) 269-4950

ARIZONA

Consultation and Training
Industrial Commission of Arizona
Division of Occupational Safety & Health
800 West Washington
Phoenix, Arizona 85007
(602) 542-5795 Fax: (602) 542-1614

ARKANSAS

OSHA Consultation
Arkansas Department of Labor
10421 West Markham
Little Rock, Arkansas 72205
(501) 682-4522 Fax: (501) 682-4532

CALIFORNIA

CAL/OSHA Consultation Service
Department of Industrial Relations
Room 1260
45 Fremont Street
San Francisco, California 94105
(415) 972-8515 Fax: (415) 972-8513

States with Approved State Plans

ALASKA

Alaska Department of Labor
1111 W. 8th Street, Room 306
Juneau, Alaska 99801
(907) 465-2700 Fax: (907) 465-2784

ARIZONA

Industrial Commission of Arizona
800 W. Washington
Phoenix, Arizona 85007
(602) 542-5795 Fax: (602) 542-1614

CALIFORNIA

California Department of Industrial Relations
45 Fremont Street
San Francisco, California 94105
(415) 972-8500 Fax: (415) 972-8513

States With Consultation Programs

COLORADO

Colorado State University
Occupational Safety and Health Section
115 Environmental Health Building
Fort Collins, Colorado 80523
(970) 491-6151 Fax: (970) 491-7778

CONNECTICUT

Connecticut Department of Labor
Division of Occupational Safety & Health
38 Wolcott Hill Road
Wethersfield, Connecticut 06109
(203) 566-4550 Fax: (203) 566-6916

DELAWARE

Delaware Department of Labor
Division of Industrial Affairs
Occupational Safety and Health
4425 Market Street
Wilmington, Delaware 19802
(302) 761-8219 Fax: (302) 761-6601

WASHINGTON D.C.

DC Department of Employment Services
Office of Occupational Safety and Health
950 Upshur Street, N.W.
Washington, D.C. 20011
(202) 576-6339 Fax: (202) 576-7282

FLORIDA

Florida Department of Labor and Employment
Security
7(c)(1) onsite consultation Program Division
of Safety
2002 St. Augustine Road,
Building E, Suite 45
Tallahassee, Florida 32399
(850) 922 8955 Fax: (850) 922-4538

States with Approved State Plans

CONNECTICUT

Connecticut Department of Labor
200 Folly Brook Boulevard
Wethersfield, Connecticut 06109
(860) 566-5123 Fax: (860) 566-1520

States With Consultation Programs

GEORGIA

7(c)(1) Onsite Consultation Program
Georgia Institute of Technology
O'Keefe Building, Room 22
Atlanta, Georgia 30332
(404) 894-2643 Fax: (404) 894-8275

GUAM

OSHA Onsite Consultation
Department of Labor, Government of Guam
P.O. Box 9970
Tamuning, Guam 69631
(671) 475-0361 Fax: (671) 477-2988

HAWAII

Consultation & Training Branch
Department of Labor and Industrial Relations
830 Punchbowl Street
Honolulu, Hawaii 96813
(808) 586-9100 Fax: (808) 586-9099

IDAHO

Boise State University, Department of health
Studies
1910 University Drive, ET-338A
Boise, Idaho 83725
(208) 385-3283 Fax: (208) 385-4411

ILLINOIS

Illinois Onsite Consultation
Industrial Service Division
Department of Commerce & Community
Affairs
State of Illinois Center, Suite 3-400
100 West Randolph Street
Chicago, Illinois 60601
(312) 814-2337 Fax: (312) 814-7238

States with Approved State Plans

HAWAII

Hawaii Department of labor and Industrial
Relations
830 Punchbowl Street
Honolulu, Hawaii 96813
(808) 586-9116 Fax: (808) 586-9104

States With Consultation Programs

INDIANA

Bureau of Safety, Education and Training
Division of Labor, Room W195
402 West Washington
Indianapolis, Indiana 46204
(317) 232-2688 Fax: (317) 232 0748

IOWA

7(c)(1) Consultation Program
Iowa Bureau of Labor
1000 East grand Avenue
Des Moines, Iowa 50319
(515) 281-5352 Fax: (515) 281-4831

KANSAS

Kansas 7(c)(1) Consultation
Department of Human Resources
512 South west 6th Street
Topeka, Kansas 40601
(913) 296-7476 Fax: (913) 296-1775

KENTUCKY

Division of Education and Training
Kentucky labor Cabinet
1047 U.S. Highway 127 South
Frankfort, Kentucky 40601
(502) 564-6895 Fax: (502) 564-4769

LOUISIANA

7(c)(1) Consultation Program
Louisiana Department of Labor
OWC-OSHA Consultation
P.O. Box 94094
Baton Rouge, Louisiana 70804
(504) 342-9601 Fax: (504) 342-5158

MAINE

Division of Industrial Labor
Maine Bureau of Labor
State House Station #82
Augusta, Maine 04333
(207) 624-6460 Fax: (207) 624-6449

States with Approved State Plans

INDIANA

Indiana Department of Labor
State Office Building
402 West Washington Street
Room W195
Indianapolis, Indiana 46204
(317) 232-2378 Fax: (317)233-3790

IOWA

Iowa Division of Labor
1000 E. Grand Avenue
Des Moines, Iowa 50319
(515) 281-3469 Fax: (515) 281-7995

KENTUCKY

Kentucky Labor Cabinet
1047 U.S. highway 127 South STE 2
Frankfort, Kentucky 40601
(502) 564-3070 Fax: 564-5387

States With Consultation Programs

MARYLAND

Division of Labor and Industry
312 Marshall Avenue, Room 600
Laurel, Maryland 20707
(410) 880-4970 Fax: (410) 880-6369

MASSACHUSETTS

The Commonwealth of Massachusetts
Department of Labor & Industries
1001 Watertown Street
West Newton, Massachusetts 02165
(617) 727-3982 Fax: (617) 727-4581

MICHIGAN (HEALTH)

Michigan Department of Public Health
Division of Occupational Health
3423 North Martin Luther King Boulevard
Lansing, Michigan 48909
(517) 335-8250 Fax: (517) 335-8010

MICHIGAN (SAFETY)

Michigan department of Consumer and
Industry Services
7150 Harris Drive
Lansing, Michigan 48909
(517) 332-1809 Fax: (517) 332-1374

MINNESOTA

Department of Labor and Industry
443 Lafayette Road
Saint Paul, Minnesota 55155
(612) 297-2393 Fax: (612) 297-1953

MISSISSIPPI

Mississippi State University
Center for Safety and Health
2906 North State Street, Suite 201
Jackson, Mississippi 39216
(601) 987-3981 Fax: (601) 987-3890

States with Approved State Plans

MARYLAND

Maryland Division of Labor and Industry
Department of labor Licensing and Regulation
1100 N. Eutaw Street, Room 613
Baltimore, Maryland 21201-2206
(410) 767-2215 Fax: (410) 767-2003

MICHIGAN

Michigan Department of Consumer and
Industry Relations
4th Floor, Law Building
P.O. Box 30004
Lansing, Michigan 48909
(517) 373-7230 Fax: (517) 373-2129

MINNESOTA

Minnesota Department of Labor and Industry
443 Lafayette road
St. Paul, Minnesota 55155
(612) 296-2342 Fax: (612) 282-5405

States With Consultation Programs

MISSOURI

Division of Labor Standards
Onsite Consultation program
Department of Labor and Industrial Relations
3315 West Truman Boulevard
P.O. Box 449
Jefferson City, Missouri 65102
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APPENDIX III

Questions and Answers on the Respiratory Protection standard

See Separate Q&A Document

August 3, 1998

MEMORANDUM TO: ALL REGIONAL ADMINISTRATORS

FROM: JOHN B.MILES JR., DIRECTOR

SUBJECT: QUESTIONS AND ANSWERS ON THE RESPIRATORY
PROTECTION STANDARD

The purpose of this memorandum is to provide the Regional Offices with a copy of the Question and Answers on the Respiratory Protection Standard (Q and A document.) It is intended to provide guidance to the field on topics relating to the Respiratory Protection Standard, 29 CFR 1910.134. This document will be useful to assist the staff in the Area Offices to answer most of most frequently asked questions.

The Q and A provides a series of questions and answers on each paragraph of the revised standard. The document includes four "attachments" that the compliance staff can use for outreach to employers. The attachments include a Spanish translation of Appendix D, a respirator-use flowchart, addresses and phone numbers of State Licensing Boards, and a "usable" copy of the Medical Questionnaire, both in English and Spanish.

The National Office will issue a Compliance Directive on the Respirator standard. The Directive will include inspection and citation guidance to ensure uniform enforcement of the respiratory standard as well as interpretations of the standard.

QUESTIONS AND ANSWERS ON THE RESPIRATORY PROTECTION STANDARD

Note: The page numbers referenced at the end of some of the Questions refer to specific pages in the January 8, 1998, Federal Register, Volume 63, No. 5.

(Revised August 17, 1998)

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Paragraph (a) Permissible Practice

(a)(1) and (2)

- Q. What changes did OSHA make to paragraph (a) of the old standard that are now reflected in the new final rule? (FR p. 1179)
- A. The final rule is essentially unchanged from the corresponding paragraphs (a)(1) and (a)(2) in the prior rule and the proposed rule. Paragraph (a)(3) was removed and not included in the Final rule.
- Q. When does the standard require respirators to be worn? (FR p.1180 & 1181)
- A. Whenever it is necessary to protect the health of the employee from contaminated or oxygen deficient air. This includes situations where respirators are necessary to protect employees in an emergency.
- Q. Does the standard cover biological hazards? (FR p.1180)
- A. The standard applies to most biological hazards (such as *Histoplasma capsulatum* spores and Bloodborne pathogens) with the exception of *Mycobacterium tuberculosis* (TB). OSHA will continue to enforce respirator use for TB under the previous respirator standard that has been redesignated 29 CFR 1910.139.
- Q. When is the employer required to provide engineering controls? (FR p. 1181)
- A. This standard does not make any changes to the longstanding hierarchy of controls which requires employers to use engineering and work practice controls where feasible. Only if such controls are not feasible or while they are being implemented may an employer rely on a respirator to protect employees.
- Q. Can a combination of administrative controls and respirators be used as interim controls while engineering control measures are developed and implemented?
- A. In general, yes. However, some of OSHA's substance specific standards, such as the asbestos standard, prohibit the use of employee rotation as an administrative control.

- Q. Will OSHA require respirators to be worn for chemicals that do not have Permissible Exposure Limits (PEL) ? (p.1181)
- A. OSHA requires respirators to be worn whenever such equipment is necessary to protect the health of employees. If an exposure to an airborne contaminant, that does not have a PEL, could result in serious illness or injury, the general duty clause could be cited in accordance with the provisions in the Field Inspection Reference Manual (FIRM), CPL 2.103 Chapter 3.
- Q. Why did OSHA drop paragraph (a)(3)?
- A. This paragraph stated that employees must use the respiratory protection provided in accordance with instructions and training they have received. However, employees' responsibilities are already stated in the OSH Act.

Paragraph (b) Definitions

Q. Why did the final revised standard remove the definition of **Adequate Warning Properties**? (FR p. 1181 and p. 1204)

A. The proposed definition of “adequate warning properties” was deleted from the final standard because the new standard does not permit employers to rely on such properties as the sole cause for changing filters. The two major warning properties, odor and irritation, are unreliable or otherwise inappropriate to use as indicators because of the fact that the air purifying materials are no longer providing adequate protection (sorbent exhaustion). Most toxic substances do not have appropriate sensory warning properties, and reported values for odor thresholds vary widely and are experienced differently by each individual. However, upon smelling or being irritated by a substance when wearing a respirator, the worker must leave the work area to change filters or replace the respirator..

Q. For which specific air contaminants will OSHA allow the use of **air purifying respirators**? (FR p.1182)

A. With some exceptions, air purifying respirators can be used for most air contaminants. Respirators for gases and vapors must either be equipped with an end-of-service-life indicator (ESDI) or the employer must implement a canister or cartridge change schedule.

Air purifying respirators must not be worn in unknown and/or Immediately Dangerous to Life or Health (IDLH), atmospheres in oxygen deficient atmospheres or in situations where the employer cannot prevent the canister or cartridge from becoming saturated. They also cannot be worn if prohibited by the respirator requirements for substance specific standards (i.e. methylene chloride) or other OSHA standards (i.e., abrasive blasting section in 29 CFR 1910.94, Ventilation). Also, the respirator manufacturer have lists of contaminants for which air purifying respirators are not recommended.

Q. Will OSHA be using the NIOSH or the ANSI **assigned protection factors** for enforcement?(FR p. 1182)

A. OSHA decided to address the entire “assigned protection factor” (APF) issue in a subsequent phase of the rulemaking. OSHA will continue to refer to NIOSH APFs in the interim, except in cases where APFs have been published in substance specific standards. Employers must rely on the best available information when selecting the appropriate respirator.

Q. Does OSHA consider a disposable paper respirator (or **dust mask**) a negative pressure

particulate respirator? (FR p. 1183)

- A. Yes, this type respirator is referred to as a **filtering facepiece** in the final standard and is defined as a negative pressure particulate respirator with a filter that is an integral part of the facepiece or with the entire facepiece composed of the filter medium.

Emergency Situation

Q. Which standard would apply where respirators are in use on a hazardous waste site?(FR p. 1182)

- A. The respirator standard is applicable whenever respirators are used unless a more specific applicable standard addresses the hazard of breathing contaminated or oxygen deficient air. The Hazardous Waste Operations standard (29 CFR 1910.120) has provisions that address respiratory protection. Therefore, those provisions would apply.

Escape -Only Respirators

Q. Can employees use mouthpiece respirators (also known as mouth breathers) for escape? (p. 1182)

- A. Yes, if the mouthpiece respirator is properly selected for the potential hazard. It is important that escape-only respirators be NIOSH approved and appropriate for the potential airborne concentration and class of substances involved. However, a mouthpiece type respirator alone would not be appropriate for escape from a chlorine spill because irritation to the eyes could impede the ability of the worker to escape. However if chemical goggles are also provided, the use of a mouthbit respirator in conjunction with chemical goggles might be acceptable in cases where employees can make an immediate and unobstructed exit from an outdoor, relatively level area involved in an emergency.

Fit Factor vs Fit Test

Q. What is the difference or relationship between a fit test and fit factor ? (FR p. 1183)

- A. A fit test is used to estimate how well the face piece of the respirator is able to form a seal with an individual's face. The "test" consists of procedures specified in Appendix A of the standard. The fit factor is a number based on the ratio of concentration of contaminate outside the respirator to the concentration inside the respirator.

High Efficiency Particulate Air (HEPA)

Q. Why is OSHA using this outdated terminology in this standard?(FR p.1183)

- A. This definition is included because the term "HEPA filter" is used in many of OSHA's substance specific standards is familiar to the regulated community. NIOSH 42 CFR 84 particulate filters, that are considered as protective, are the N100, R100, and P100 filters.

Immediately Dangerous to Life or Health (IDLH)

- Q. There are various published and sometimes conflicting IDLH limits. What levels will OSHA use for enforcement purposes?(FR p.1185)
- A. OSHA has not established its own set of IDLH values. OSHA considers an atmosphere to be IDLH when it poses an immediate threat to life, could cause irreversible adverse health effects, or could impair an employee's ability to escape. The 1990 recommended IDLH values found in the NIOSH Pocket Guide to Chemical Hazards may be used to support OSHA enforcement action. An employer may show however that another source of IDLH values is valid and then may rely on such a source.
- Q. How will OSHA address a short, one time acute exposure that does not immediately cause death but causes immediate or near-term adverse effects that do not last? For example, a single exposure to an atmosphere containing life threatening or health impairing concentrations of fluoride, cadmium fumes or radioactive substances may not cause death or permanent impairment for days or even weeks after the exposure.(FR p.1184)
- A. In these situations the key considerations are the severity of the adverse effects and the certainty that health impairment will occur following an acute exposure. Where the immediate adverse effects are severe or ultimate health impairment is certain, the short duration of the effect or the delay in the onset of the health impairment is not a factor.
- Q. Does OSHA consider exposures in excess of short term exposure limits (STELs), or ceiling limits a potential IDLH atmosphere? (FR p.1184)
- A. Generally, no. Most STELs and ceiling values are designed to reduce the risk of less serious effects, such as sensory irritation. Only an acute exposure, that would threaten life, cause irreversible health effects, or impede the ability of the worker to escape is considered IDLH.
- Q. Does OSHA consider all oxygen deficient atmospheres to be potential IDLH situations? (FR p.1186)
- A. Yes. An atmosphere with an oxygen content below 19.5% by volume is considered

oxygen deficient. 29 CFR 1910.134(d)(2)(iii) of the final Respiratory Protection Standard provides specific exceptions in accordance with various altitudes as described in Table II of the standard.

Physician or Other Licensed Health Care Professional (PLHCP)

- Q. Is a licensed vocational or practical nurse, (LVN or LPN) and/or Registered Nurse, (RN) considered a PLHCP and qualified to review the employee medical evaluation questionnaire?(FR p.1186)
- A. The OSHA standard requires the Health Care Professional to be legally permitted to provide the healthcare services required by paragraph (e). It is state law that determines the legal scope of practice. Licensing rules vary from state to state.

Qualitative Fit Test, (QLFT)

- Q. What is the maximum fit factor for which an employer may use a QLFT? (FR p.1225)
- A. 100, since the OSHA accepted QLFT protocols have been validated for a fit factor of 100.

User Seal Check

- Q. Specifically, what action is required of the respirator user to determine if the respirator is properly seated? How often must a seal check be done?(FR p.1187)
- A. The "action" required in a user seal check is described in Appendix B-1 of the standard. The standard in paragraph (g)(1)(iii) requires the user to perform a user seal check each time a tight fitting respirator is put on.

Paragraph (c) Respiratory Protection Program

(c)(1)

- Q. Do all the required elements of a respiratory protection program need to be addressed in writing? (FR p. 1190)
- A. All the worksite specific procedures and elements for required respirator use applicable to the particular worksite must be in writing. However, paragraph (c)(2)(ii) makes clear that the written program need not address those employees who are not required to use respirators, but who voluntarily wear filtering facepiece respirators.

(c)(1)

- Q. How frequently should the written respiratory protection program be updated?
- A. The standard requires that employers revise the program as necessary to reflect changes in the workplace or in respirator use. The written program shall be updated whenever the change occurs. Changes would include different respirator choices, changes in fit testing, and work operations that change.

(c)(1)

- Q. What if the employer requires respirators to be worn, although employees are not exposed to airborne contaminants in excess of the PEL? (FR p.1191)
- A. Employer required use triggers a full respirator program covering all the elements.

(c)(1)(vii)

- Q. Does training on hazardous chemicals required by the Hazard Communication standard meet the requirement for training on respiratory hazards? (FR p.1193)
- A. Yes, but only partially. Some respiratory hazards are exempt from the Hazard Communication rule; i.e., biological hazards and radioactive hazards. Annual training on all applicable respiratory hazards is required by the Respiratory Protection standard.

(c)(1)(ix)

- Q. How often should the effectiveness of the respiratory protection program be evaluated?(FR p. 1193)

A.. OSHA does not have a required interval. In workplaces where worksite specific conditions are relatively stable, such as a manufacturing site, program evaluation may be conducted on a regular schedule. Where worksite conditions are less stable, such as in the construction industry, employers must develop evaluation schedules that reflect the actual conditions at the worksite as necessary.

Q. Does the employer have the flexibility to develop a corporate written program that would be applicable to all facilities (a generic program)?

A. Yes. The employer may have different sites with very similar operations, where a corporate program could be used. It must however, include site specific provisions to reflect different site conditions.

(c)(2)

Q. In situations where employees choose to wear elastomeric respirators voluntarily, is a written respiratory program addressing medical evaluation, cleaning, disinfecting, storage and maintenance required?(FR p.1189)

A. Yes, the employer must have a written program that covers the elements that could affect the health of any employee who wears this type of respirator.(FR p.1183)

(c)(2)(ii)

Q. Is a written respiratory protection program required for voluntary use of filtering facepieces?

A. No. The employer is obligated to determine that such respirator use will not itself create a hazard and to provide the respirator users with the information contained in Appendix D of the standard.

Q. If the employer has determined that no hazard exists, but an employee asks the employer for a respirator because a "smell" is bothersome, would this be considered "voluntary use"? If all the employees in the area wore a respirator, is this still voluntary use?

A. Yes, in both situations.

(c)(3)

Q. How will the Compliance Safety and Health Officer (CSHO) determine that a person is

qualified and/or trained to be a respirator program administrator? (FR p.1194)

- A. The CSHO will review the written program and interview the respirator program administrator (program administrator). Questions asked during the interview would focus on determining how familiar the person is with the respirator standard and the use of the respirators at the particular workplace.

(c)(3)

Q. What is meant by "appropriate" training or experience? (FR p.1194)

- A. Training or experience must be extensive enough for the program administrator to fulfill the minimum requirements. The appropriate training will be dependent on the complexity of their respiratory program needs.

(c)(3)

Q. May an employer have more than one program administrator? (FR p.1195)

- A. Yes. Each worksite where respirators are required must have a respiratory program. However, where there is more than one worksite, there will be a program at each site. In that circumstance there may be a program administrator for each program.

(c)(3)

Q. Does the standard provide a list of approved training courses for program administrators? (FR p.1193)

- A. No. OSHA only requires the program administrator to have a level of training adequate to deal with the complexity of the respirator program at the worksite.

(c)(3)

Q. Where can a small employer receive help on compliance with this standard?

- A. OSHA is preparing a Small Entity Compliance Guide with a sample respirator program. It will be available on the OSHA web site at <http://www.osha.gov>.

(c)(4)

Q. Does the employer have to pay for any of the expenses associated with the voluntary use of respirators? (FR p.1195)

- A. The voluntary use of an **elastomeric mask** requires that the employer have a written

program, ensure the employee is medically able to use the respirator, and that the respirator does not present a health hazard and provide a copy of Appendix D to the employee. To the extent that the above items may create an expense, these costs would be covered by the employer. The employer can choose to supply the respirator and cartridges at no cost to the employee. If the employee supplies their own respirator, the cost of the respirator and cartridges would be the responsibility of the employee. For **voluntary users wearing dust masks**, the employer must provide at no cost to the employee, a copy of Appendix D. Where respiratory protection is required either by the employer or by the OSHA, the employer must pay all costs associated with the standard.

Q. Can an employer (whether or not a small business) rely on the Small Entity Compliance Guide?

A. The Small Entity Compliance Guide is being provided to help employers to comply with the standard. All businesses, small and large, must have a full respirator program where respirators are required. This guide contains a sample Respiratory protection program that many employers will find useful. Under the Small Business Regulatory Enforcement Act, small businesses may use the guide in challenging the appropriateness of a penalty in an OSHA enforcement action.

Paragraph (d) Selection of Respirators

(d)(1)(i)

Q. What is meant by user factors? (FR p.1196)

A. User factors may include medical conditions that may make usage of particular types of respirators difficult i.e. high level of exertion, poor sense of smell, and physical characteristics such as facial scars that may cause difficulties with fit.

(d)(1)(i)

Q. What is meant by workplace factors? (FR p. 1196)

A. "Workplace factors" mean the amount of time the respirator will be worn, dimensions and configuration of the work space, temperature and humidity of the work environment, need for unimpeded vision, need for communication with other workers, need for other personal protective equipment, and the presence of other contaminants.

(d)(1)(ii)

Q. What is meant by conditions of a respirator's certification? (FR p. 1197)

A. Respirators are certified by NIOSH as an assembly. Also conditions of certification means limitations of use stated by NIOSH that accompany certification. Parts from other manufacturers or models cannot be substituted. In the case of airline respirators, the conditions of the certification include operating pressures and hose specifications. Air purifying respirators are certified with limitations that include not using them in IDLH conditions and not using them in atmospheres containing less than 19.5% oxygen.

(d)(1)(iii)

Q. What is meant by "a reasonable estimate of employee exposures?" (FR p. 1198)

A. Exposures must be characterized, through methods that may include actual measurements of exposure at a worksite, exposure data from industry or supplier, and calculations of concentration based on amount used (mathematical models). Data from industry-wide surveys by trade associations may be used as long as they closely resemble the processes and work conditions as described in the survey. The standard does not specify how an employer is to make a reasonable estimate, nor does it require the employer to measure employee exposure. (The comprehensive substance-specific health standards have employee exposure monitoring requirements.) Even with actual measurements of exposure, some estimation is still involved, since monitoring only determines the exposure on a particular day for a specific employee.

(d)(1)(iii)

Q. Is the employer required to have personal monitoring data when selecting a respirator? (FR p. 1200)

A. While personal exposure monitoring is the most reliable approach for assessing the level of respiratory protection required, it may not always be necessary to take personal exposure measurements to determine whether (or what level of) respiratory protection is needed. Appropriate safety factors should be used when using estimates of employee exposures.

(d)(1)(iii)

Q. Do estimates of employee exposures have to be made by a credentialed individual, for example, a certified industrial hygienist? (FR p. 1200)

A. The standard does not require that the person making the estimate have a particular credential. Persons trained and experienced in evaluating respiratory hazards posed by workplace atmospheres are the most competent to evaluate exposure levels.

(d)(1)(iii)

Q. If an employer cannot identify the contaminant or reasonably estimate employee exposures, is the employer required to consider the atmosphere to be IDLH?

A. Yes, unless under worst case assumptions, exposures would not be IDLH. For example, there may be some information available on air concentrations, but not enough data to reasonably estimate the actual employee exposures. However, by making reasonable assumptions about the maximum concentrations that could exist, the employer may be able to show that IDLH conditions would not occur. In other situations it may not be feasible to identify all of the air contaminants, but through information on the process one may be able to determine that IDLH conditions could not occur.

(d)(1)(iv)

Q. How many respirator models and sizes are sufficient? (FR p. 1200)

A. The requirement of the standard is performance- based; the numbers of models and sizes must be sufficient to provide a range of sizes and configurations so that all users can achieve acceptable fits.

(d)(2)(i)

Q. Can any supplied air respirator be used for entry into IDLH atmospheres? (FR p.1201)

- A. No. Paragraph (d)(2)(i) requires a full facepiece pressure demand Self Contained Breathing Apparatus (SCBA) certified by NIOSH for a minimum service life of thirty minutes or a combination full facepiece pressure-demand supplied-air respirator with auxiliary self-contained air supply.

(d)(2)(iii)

Q. When is an oxygen-deficient atmosphere considered IDLH? (FR p.1202)

- A. All oxygen-deficient atmospheres ($O_2 < 19.5\%$ by volume) are considered IDLH with one exception. If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II (i.e., for the altitudes set out in Table II), then any atmosphere-supplying respirator may be used.

(d)(2)(iii)

Q. Why is altitude an important consideration for determining oxygen deficiency? (FR p.1202-1203)

- A. An increase in altitude results in a decrease of atmospheric pressure along with a decrease in the partial pressure of oxygen. A reduction in the partial pressure of oxygen may result in oxygen deficiency for the worker. For additional information reference American National Standards Institute (ANSI) Z88.2-1992, Section A.5.

(d)(3)(i)

Q. Does the employer need to consider emergency situations? (FR p. 1203)

- A. Yes. When selecting respirators for non-IDLH routine use, the employer must consider additional problems related to reasonably foreseeable emergency situations. In addition, there are substance-specific standards such as asbestos, and other standards such as HAZWOPER that have requirements to be followed in the event of an emergency.

(d)(3)(i)(A)

Q. What assigned protection factors (APFs) may be used? (FR p. 1203)

- A. Until APFs are established through rulemaking, employers must rely on the best available information when selecting the appropriate respirator. OSHA will continue to refer to NIOSH APF's except where different APF's have been published in substance specific standards. Where OSHA has specific compliance interpretations that set APFs for certain respirators, such as abrasive blasting respirators used for protection against lead, these must be followed.

(d)(3)(ii)

Q. What is meant by 'physical form' of air contaminant? (FR p. 1204)

A. Physical form refers to whether the air contaminant is a gas, vapor, mist, fume, or dust; or some combination. For example, solvents commonly used in paints may be present as vapors and as mists, and an air purifying respirator would need to provide protection against both.

(d)(3)(ii)

Q. What is meant by 'chemical state' of an air contaminant? (FR p. 1204)

A. Chemical state refers to its valence state. For example, chromium needs to be identified by its valence state (or the chemical compound) because chromium VI compounds have much lower exposure limits than chromium metal, chromium II or chromium III compounds.

(d)(3)(iii)(B)

Q. Can end of service life indicators (ESLI) be used under all workplace conditions? (FR p. 1205)

A. ELSIs are NIOSH certified for only a few contaminants. NIOSH tests them under most conditions of use. Cartridges and canisters equipped with ELSIs can be used only if they are appropriate for the conditions of the employer's workplace. An example of a workplace condition that may adversely affect an ESLI is where a cartridge equipped with a moisture dependent ESLI is used in an extremely dry atmosphere.

(d)(3)(iii)(B)

Q. Where can change schedules be obtained? (FR p. 1205)

A. Data supporting schedules may be available for certain chemicals and respirator cartridges through respirator manufacturers and suppliers, industry associations and chemical manufacturers.

(d)(3)(iii)(B)

Q. How can an employer develop a change schedule? (FR p. 1206)

A. Employers must develop cartridge change schedules based on available data or information that can be relied upon to ensure cartridges are changed before the end of their useful service life. Workplace factors such as contaminant concentration, presence of other contaminants, airflow through the filter, temperature, and humidity must be

considered. Certain chemicals "migrate" through the sorbent in storage. Employees must be aware of this information as well.

(d)(3)(iv)

Q. Are N95 filters allowed for contaminants with permissible exposure limits below 0.05 mg/m³?

A. Yes, if oil aerosols are not present, and there are no applicable OSHA standards requiring the use of HEPA filters. If filters are chosen from among those certified under 30 CFR Part 11, which carry the designation TC 21C-xxxx, only HEPA filters can be used.

(d)(3)(iv)

Q. How can an employer determine if the mass median aerodynamic diameter (MMAD) of a contaminant is less than 2 micrometers?

A. Ranges of MMAD for various processes have been reported in published articles. It also is possible to determine ranges through testing. If the MMAD cannot be determined, a HEPA filter, or a filter certified for particulates by NIOSH under 42 CFR part 84 (N95 or higher) must be selected.

Paragraph (e) Medical Evaluation

(e)(1)

Q. Are seasonal or temporary workers exempt from the requirement for medical evaluations? (FR p. 1209-1210)

A. No. The frequency and duration of respirator use and the worker's term of employment, does not affect the requirement for medical evaluation.

Q. Can a fit test for a respirator be performed before the initial medical evaluation has been completed? (FR p.1209)

A. No. The initial medical evaluation must be conducted prior to fit testing to identify individuals whose health may be harmed by the limited amount of respirator use associated with fit testing.

Q. Are employees who use filtering facepiece respirators (dust masks) voluntarily (e.g., for employee comfort) also required to have medical evaluations? (FR p.1190, 1210)

A. No. If the employer has determined that there is no hazard, and dust mask use is voluntary, then no medical evaluation is required. If employers allow voluntary use of this type of respirator, then they must provide the employee the information contained in Appendix D of the standard, and ensure that such respirator use will not itself create a hazard.

Q. Are medical evaluations required for positive pressure, as well as negative pressure, respirators? (FR p.1210)

A. Yes. Clinical studies show that positive pressure respirator use can harm the employee.

(e)(2)(i)

Q. Are physicians the only medical professionals allowed to perform medical evaluations for respirator use? (FR p.1211)

A. No. A variety of health care professionals may do this depending on the scope of practice permitted by the state's licensing, registration, or certification agencies. Each employer must check with the state licensing agency to see if other health care professionals under their state law can independently perform this evaluation, or must do so under the direction of a licensed physician. Attached to this document is a phone listing of all the

State Licensing Boards in the United States, to assist in determining compliance with this provision.

Q. Can a nurse who does not meet the qualifications of a PLHCP assess a questionnaire? (FR p. 1212)

A. A nurse not otherwise qualified to be the PLHCP can perform some tasks, such as distributing the questionnaire, respond to some questions such as providing advice to employees on where they can obtain assistance in understanding or reading the questions, and gathering the completed forms in preparation for delivery to the PLHCP. If the nurse is working under the direction of a physician (or other PLHCP consistent with state law) who will perform the final review of the assessment, then this arrangement is acceptable.

(e)(2)(ii)

Q. Does the employer have to use the exact language of the questionnaire in Appendix C if they choose to evaluate by medical questionnaire? (FR p. 1212)

A. The language of Part A, Appendix C is mandatory if the employer chooses to medically evaluate by questionnaire. The employer may choose a medical examination in lieu of the medical questionnaire.

Q. If the employer chooses to provide physical exams, rather than use the questionnaire, what information must be obtained?

A. The employer who chooses to skip the questionnaire, and instead go directly to an exam shall ensure that the exam obtains the same information as is found in the questionnaire.

Q. May the PLHCP add questions to the questionnaire provided in Appendix C? (FR p. 1283)

A. Yes. Part B of the questionnaire contains 19 optional questions that may be added. In addition, the instructions to Part B state that any other questions not listed can be added.

Q. Why do employees have to answer questions about hearing and vision impairments? (FR 1214)

A. Questions 10 through 15 of Appendix C must only be answered by those who will use full facepiece or SCBA respirators. The configuration of these respirators can further reduce hearing and vision.

Q. If an employee will be wearing an SCBA, does a positive response to any of the items in Questions 10 thru 15 of Part A, Section 2 require a medical exam?.

A. Yes.

(e)(3)(i)

Q. Who determines the scope and form of the medical evaluation if an employee gives a positive response to questions 1 through 8 in Section 2, Part A of the questionnaire? (FR 1214)

A. The PLHCP makes this determination. The PLHCP is also expected to refer the employee to a physician if warranted.

Q. If there is a single positive response on the questionnaire, does that automatically require a face-to-face visit with the PLHCP? (FR p. 1214)

A. No, the scope of the medical evaluation is left to the discretion and professional judgment of the PLHCP. There may be occasions where all that is needed is clarification of an issue by telephone.

(e)(3)(ii)

Q. If a PLHCP's scope of practice is limited to questionnaire evaluation or a basic physical exam, can that PLHCP still be used even though further testing and decision making may be necessary? (FR p.1214)

A. Yes. In some cases where medical issues arise that are beyond the scope of the PLHCP's license, the remainder of the evaluation will need to involve a physician or other authorized health care professional (for example, conducted under the direction of a physician).

Q. Can an employee decline to be medically evaluated for the use of a respirator? (FR p.1220-1221)

A. Paragraph (e)(1) requires the employer to provide a medical evaluation to an employee before the employee uses a respirator in the work place. Therefore, an employee cannot refuse to undergo medical evaluation and continue to use a respirator.

(e)(4)(i)

Q. Who pays for the medical evaluation and any subsequent exams? (FR 1214)

- A. The employer must pay for the medical evaluation and any related expenses incurred by the employee during the evaluation, including travel costs.
- Q. Does the medical questionnaire have to be administered by a PLHCP? (FR 1214-1215)
- A. While the employee must be able to discuss the results of the questionnaire with the PLHCP, the standard does not specify the qualifications of the individual who administers the medical questionnaire.
- Q. How does an employer ensure the employee understands the questions on the medical questionnaire if the employee only speaks and/or reads a language other than English? (FR p. 1215)
- A. Under these circumstances, the PLHCP can assist the employee in filling out the questionnaire, with the aid of an employer-provided interpreter. The interpreter need not be a professional and can be a bilingual employee, family member, or friend who is fluent in the native language of the person answering the questionnaire. The employer may also have the questionnaire translated into the appropriate language.
- Q. What happens if an employee has difficulty reading or understanding the questionnaire? (FR p.1215)
- A. The employer must take action to ensure the employee understands the questionnaire. The employer may have the PLHCP assist the employee in filling out the medical questionnaire or go directly to a physical examination.
- Q. Why does the questionnaire in Appendix C begin with the question "can you read"? (FR p.1215 & 1282)
- A. This question is included to remind those who are responsible for administering and reviewing the questionnaire that employees who cannot read may need additional assistance in completing the questionnaire.
- (e)(4)(ii)**
- Q. How can an employer ensure the employee understands the medical questionnaire while still meeting the requirements of confidentiality? (FR p.1215)
- A. Since the medical questionnaire provided in the standard was designed to be easily understood, oversight should not generally be necessary. When employees have questions

about the questionnaire, they must be provided with the opportunity to discuss the questions with the PLHCP.

Q. What procedures should be used to maintain confidentiality if the questionnaire is administered by the employer? (FR p.1215 & 1282)

A. The directions to the employee for answering the medical questionnaire state that the employer must not look at or review their answers. The employee must be instructed on how to deliver or send the completed questionnaire to the PLHCP who will review it. One method for accomplishing this task is for the employer to provide the employee with a stamped envelope addressed to the PLHCP at the time the questionnaire is administered.

(e)(5)(i)

Q. Why does supplemental information need to be provided to the PLHCP? (FR p.1216-1217)

A. When evaluating an employee's medical limitations, the PLHCP may need to consider other workplace variables that may increase pulmonary and cardiovascular stress during respirator use.

Q. Why is there no specific requirement to give the PLHCP a list of substances the employee may be exposed to? (FR 1215-1216)

A. The company's written respiratory program already specifies the exposure conditions that require the use of a respirator. A copy of the written program must be provided to the PLHCP instead. The program will provide the necessary information to the PLHCP without imposing an additional paperwork burden on employers.

Q. Does the PLHCP have to visit the worksite to perform a medical evaluation? (FR p.1217)

A. While it might be helpful for the PLHCP to visit the site, there is no requirement to do so under the standard. The supplemental information required to be provided to the PLHCP by the standard is sufficient for the PLHCP to make a valid recommendation on the employee's ability to wear a respirator.

(e)(5)(ii)

Q. How often must supplemental information be provided to the PLHCP? (FR p.1217)

A. It need only be provided once, unless there are changes in the supplemental information;

in that case updated information must be provided to the PLHCP. If you change PLHCP's, then the employer must assure that all the information has been transferred or that new documents are provided to the new PLHCP.

Q. Can an employer choose to let each employee use their own personal physician to provide a medical evaluation rather than using the employer's PLHCP? (FR p.1217)

A. Yes. This may be a workable system where few employees are involved. The employer will have to contact each of these PLHCPs and provide them with a copy of the Respiratory Protection standard and other required supplemental information, as well as updates when required. The employer shall bear the costs of the evaluation. It is not acceptable for an employee to use their health insurance for this purpose, unless the employer pays 100% of the insurance premiums.

(e)(6)(i)

Q. Who is responsible for determining an employee's ability to use a respirator? (FR p.1218)

A. The responsibility rests with the employer. The PLHCP's opinion regarding the employee's medical ability to wear a respirator is an important element in making the final determination.

Q. Does the PLHCP's opinion on the employee's medical ability to use a respirator have to be in writing? (FR p. 1218)

A. Yes.

Q. If the PLHCP discovers that the employee uses drugs, does the PLHCP have an obligation to tell the employer? (FR p.1218)

A. No. The PLHCP must maintain strict confidentiality on specific medical findings unrelated to the ability to wear a respirator. Information regarding pregnancy, genetic susceptibility, mental health problems, and drug use are not to be revealed to the employer when they result from the medical evaluation process. These findings must remain confidential. How specific medical information is addressed between the employee and PLHCP should be determined by the legal, professional, and ethical standards that govern the PLHCP's practice.

Q. Can the employer maintain a copy of the employee's completed medical questionnaire? (FR p.1218 & 1282)

A. No. The employer must maintain only the PLHCP's written recommendation on an employee's eligibility to wear a respirator. The completed questionnaire and PLHCP's documented findings or diagnosis are confidential and must not be maintained by the employer. An exception is made when the employer's health office is administratively separate from the employer's central administration offices.

Q. How does the PLHCP's opinion affect periodic medical evaluation? (FR p. 1218)

A. The final standard does not automatically require periodic medical reevaluation. It is critical, however, that the PLHCP address this issue in their medical opinion. If there is an underlying medical concern that requires periodic medical reevaluation, it must be included in the written medical opinion so that the employee can be monitored in the future by the PLHCP.

Q. How can the employee obtain a copy of their medical evaluation or the medical questionnaire? (FR p.1218)

A. The employer is required to provide a copy of the written opinion to the employee. The written opinion should be provided by the PLHCP but can be provided by the employer. Requests for copies of the questionnaire should be made to the PLHCP consistent with the requirements of 29 CFR 1910.1020, "Access to Employee Exposure and Medical Records".

(e)(6)(ii)

Q. Does the employer have to provide a powered air-purifying respirator (PAPR) to an employee who can't wear a negative pressure respirator? (FR p.1218-1219)

A. The employer must provide a PAPR if the PLHCP determines that the use of a negative pressure respirator would place the employee at increased risk for adverse health effects and the PLHCP finds that the employee can use a PAPR. If a subsequent medical evaluation finds that the employee is able to use a negative pressure respirator, a PAPR need no longer be provided.

(e)(7)

Q. Does the employer have to medically reevaluate the employee's ability to wear a respirator on an annual basis? (FR 1219)

A. No. There is no annual or periodic requirement for medical reevaluation. The standard lists four conditions that trigger medical reevaluation: an employee reports signs or symptoms related to the ability to wear a respirator; the PLHCP, administrator or

supervisor determine it is necessary; information from the respiratory protection program indicates a need for reevaluation; or a change in workplace conditions substantially increases the physiological burden placed on the employee.(FR p.1219-1220)

Q. Is there a medical removal provision in this standard for persons medically unable to wear a respirator? (FR p.1220)

A. No. The final standard does not include a medical removal provision.

Paragraph (f) Fit testing

(f)(1)

Q. Do all tight-fitting respirators which are required by the employer or by OSHA have to be fit tested? (FR p. 1188, 1189, 1191, 1222)

A. Yes. Both negative pressure and positive pressure tight-fitting respirators must be fit tested.

(f)(1)

Q. Does a Self-Contained Breathing Apparatus (SCBA) require fit testing? (FR p. 1223, 1224)

A. Yes, SCBAs require a fit test. Most workplace use of positive pressure atmosphere-supplying respirators occurs in high hazard atmospheres where a high degree of certainty is required that the respirator is maximally effective. Fit testing of tight-fitting positive pressure facepieces is appropriate to reduce the chance of leakage into the facepiece.

(f)(1)

Q. Do tight-fitting negative pressure respirators that are worn voluntarily require a fit test? (FR p. 1222)

A. No, respirators worn when not required by OSHA or the employer do not require a fit test.

(f)(1)

Q. Do loose-fitting respirators require a fit test? (FR p. 1222)

A. No, loose-fitting respirators do not require a qualitative or quantitative fit test. (FR p. 1222)

(f)(2)

Q. Which respirator use requires fit testing? (FR p. 1222, 1223, 1225)

A. Fit testing is required when OSHA or the employer requires employees to wear tight-fitting respirators. The employee must pass a fit test prior to the initial use of the respirator. Additional fit tests are required whenever the employee reports, or the employer, PLHCP, Supervisor or Program Administrator observes changes in the employee's physical condition that could affect respirator fit.

If the employee changes to a different fitting facepiece a new fit test is required. An annual fit test is required after the initial fit test.

(f)(4)

Q. When would the fit of a respirator be unacceptable? (FR p. 1225)

A. A respirator may be unacceptable if it causes irritation or pain to an employee, if the employee is unable because of discomfort to wear the respirator for the time required, or if the employee is unable to maintain proper seal.

(f)(5)

Q. Can an employer use any method of fit testing? (FR p. 1223, 1226)

A. No. The employer must use one of the OSHA-accepted qualitative or in some cases quantitative fit test protocol. OSHA-accepted protocols are found in Appendix A of the 29 CFR 1910.134 Respiratory Protection Standard.

(f)(5)

Q. Can an employer develop its own fit testing method? (FR p. 1228)

A. Any new fit testing methods must first meet the acceptance requirements of Section II of Appendix A, before it can be used.

(f)(5)

Q. Does a "user seal check" qualify as a fit test? (FR p. 1188)

A. No, a User Seal Check is a procedure the employee performs each time they don the respirator. The purpose of the User Seal Check is to ensure the respirator is properly seated to the user's face. It is not a substitute for a fit test of a particular type, model, and size of a respirator.

Q. Can a qualitatively fit-tested tight fitting negative pressure air-purifying respirator be used in an atmosphere greater than 10 times the PEL? (FR p. 1227)

A. No. A qualitatively fit-tested tight fitting negative pressure air-purifying respirator can only be used in an atmosphere less than or equal to 10 times the PEL.

(f)(5)

Q. Will OSHA establish a mechanism to evaluate and approve new fit testing methods?

A. The mechanism is already described in Part II of Appendix A of the standard. Parties with a new fit testing method must supply a detailed description of the method as well as data from an independent government research laboratory or from a study published in a peer reviewed industrial hygiene journal supporting the new method's performance. Upon receipt of this information, OSHA will initiate rulemaking to add this method to Appendix A of the Respirator Standard. (FR p. 1221)

(f)(6)

Q. What negative-pressure respirators may be fit tested with a QLFT?

A. Negative-pressure air purifying respirators that will be worn in concentrations that are equal to or less than ten times the Permissible Exposure Level may be fit tested using QLFT. The limitation on the air contaminant concentration is discussed in (f)(7) below.

(f)(6)

Q. Can QLFT be used to test the fit of a full facepiece negative pressure air purifying respirator? (FR p. 1222)

A. The factor that limits the use of QLFT is the concentration of the air contaminant in which it is being worn. If the full facepiece respirator is only being worn in air contaminant concentrations that are equal to or less than ten times the PEL, then QLFT can be used. However, it cannot be used in air concentrations greater than ten times the PEL unless it is fit tested using a Quantitative Fit Test (QNFT).

(f)(6)

Q. How will OSHA deal with an application for a QLFT protocol that measures fit factors greater than 100?

A. If new methods are developed that permit QLFT use for higher fit factors, OSHA may, as part of the acceptance process for these new methods (described in the explanation for (f)(5) above), adjust the present language in (f)(6) appropriately.

(f)(7)

Q. Since the standard does not define the term "assigned protection factor" can an employee wear tight fitting air purifying respirators to concentrations of 100 times the PEL for half facepiece respirators and 500 times the PEL for full facepiece respirators if they are quantitatively fit tested?

- A. No. The fit factors of 100 and 500 only define what fit factor is necessary to pass the fit test. The preamble states that the standard incorporates a safety factor of ten because protection factors in the workplace tend to be much lower than the fit factors achieved during fit testing. The use of a safety factor is a standard practice supported by most experts to offset this limitation. The use of safety factors of ten is recommended by a number of experts and is included in the ANSI standard for respiratory protection.

(f)(7)

Q. What are acceptable fit factors for tight-fitting half facepieces and tight-fitting full facepieces respirators that are fit tested using QNFT?

- A. The acceptable fit factors are explained in section (f)(7): 100 for a half facepiece and 500 for a full facepiece.

(f)(8)

Q. Does this paragraph require fit testing of positive pressure respirators such as SCBAs, PAPRs, and Supplied Air Respirators (SARs) ? (FR p. 1226)

- A. Yes. The standard requires fit testing of the facepiece to check for leakage. The standard allows the employer to conduct the test by using a negative pressure respirator with a facepiece of the same make, model and size as the positive pressure facepiece, or by temporarily converting the facepiece for the positive pressure apparatus to a negative pressure device and performing the fit test.

(f)(8)

Q. Can a tight fitting PAPR be tested simply by not turning the fan motor on?

- A. Yes. By not turning on the fan motor, a PAPR would be operating in the negative pressure mode.

(f)(8)

Q. Is there a frequency of use below which fit testing would not be required for atmosphere supplying respirators? Often, emergency SCBAs are available for fire brigade or hazardous substance emergency response personnel, but these personnel may not use the equipment in a hazardous atmosphere for several years.(FR p. 1226)

- A. The standard's requirement of annual fit testing applies to emergency response personnel who wear respirators to protect against hazardous atmospheres. Proper fit is especially necessary for emergency personnel.

These people may only wear the equipment infrequently, but when they do use the equipment, they often use it in very dangerous atmospheres.

(f)(8)(iii)

Q. Can a probe hole be drilled in a facepiece to perform QNFT and then the probe hole be sealed so the facepiece can be used on the respirator?

A. No. As the second sentence of section (f)(8)(ii) says, the permanently probed respirator only serves as a surrogate for testing purposes. A face piece with a probe hole drilled in it cannot be restored to its NIOSH-approved configuration.

Q. For quantitative fit testing, must employers still perform three fit tests?

A. No.

Paragraph (g) - Use of Respirators

(g)(1)(i)(A)

Q. Can an employee wear a tight-fitting respirator with a beard or other facial hair? (FR p.1237)

A. No. When respirators are required, an employer is prohibited from allowing respirators with tight-fitting facepieces to be worn by employees who have "facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function."

Q. May employees who have facial hair wear respirators? (FR p. 1238)

A. The standard requires employers to take the presence or absence of facial hair into consideration in selecting respirators; different company policies may affect the range of choices available. However, several types of respirators such as loose-fitting hoods or helmets accommodate facial hair.

Q. Does section (g)(1)(i)(A), facial hair, apply to voluntary use?

A. If the employer has determined that there is no hazard, voluntary users are not prohibited by the standard from wearing a beard. Traditionally, good industrial hygiene practice recommends that facial hair that interferes with the face-to-facepiece seal should be avoided.

(g)(1)(i)(B)

Q. What employee conditions prohibit the use of tight-fitting respirators? (FR p. 1238)

A. An employer cannot allow employees who have any condition that interferes with the face-to-facepiece seal or valve function to wear respirators with tight-fitting facepieces. Examples of these conditions include, but are not limited to, missing dentures, the presence of facial scars, the wearing of jewelry, or the use of headgear that projects under the facepiece seal. This provision prohibits employers from placing an employee in a tight-fitting respirator if there is any factor that could prevent an adequate facepiece-to-face seal. Respirator use is permitted where conditions such as missing dentures or facial scars do not prevent an adequate seal.

(g)(1)(ii)

Q. Can corrective glasses, goggles, or other personal protective equipment be used with tight-fitting respirators? (FR p.1239)

A. The standard is written in performance terms so that any particular piece of equipment may be used as long as it does not interfere with the facepiece seal. Corrective glasses or goggles or other personal protective equipment can be used with tight-fitting respirators, but employers must ensure that they are worn in a manner that does not interfere with the seal of the facepiece to the face of the user. Eyeglass inserts or spectacle kits are acceptable if the devices: (1) do not interfere with the facepiece seal; (2) do not cause any distortion of vision; and (3) do not cause any physical harm to the wearer during use.

(g)(1)(ii)

Q. What does OSHA mean by "other personal protective equipment"? (FR p. 1239)

A. "Other personal protective equipment" applies to faceshields, protective clothing, and helmets, as well as to any other form of personal protective equipment that an employee may wear that could interfere with safe respirator use.

(g)(1)(ii)

Q. May employees wear contact lenses with respirators ? (FR p. 1239)

A. Contact lenses may be used with respirators. OSHA's review of the record identified no evidence that the use of contact lenses with respirators increases safety hazards. Employers who have employees who wear corrective eyewear must be sure that the respirator does not interfere with the eyewear, make it uncomfortable, or force the employee to remove the eyewear. Employers should use the respirator selection process to make accommodations to ensure that their respirator-wearing employees can see properly when wearing these devices.

(g)(1)(iii)

Q. What procedures must be followed to perform a "user seal check"? (FR 1239)

A. The "user seal check" procedures in Appendix B-1 or equally effective procedures recommended by the respirator manufacturer must be used.

The positive/negative user seal checks described in Appendix B-1 cannot be performed on some tight-fitting respirators by employees with small hands who cannot block off the valves. Some manufacturers make a fit check cup that can be used to perform a user seal check with filtering facepiece respirators. The final rule allows for the use of the methods in Appendix B-1 as well as manufacturers' recommended procedures for user

seal checks where these are equivalently effective. This means that respirator manufacturers' recommended procedures may be used for user seal checking if the employer demonstrates that the manufacturer's procedures are as effective as those in Appendix B-1 of the standard. The "equally effective" phrase ensures that the procedures used have been demonstrated to be effective in identifying respirators that do not seal properly when donned or adjusted.

OSHA does not permit the use of respirators that cannot be seal checked. If no method exists to check whether a respirator re-seals during multiple re-donnings, under actual workplace conditions, OSHA does not consider the respirator acceptable for use.

(g)(1)(iii)

Q. What does OSHA mean by "...ensure that employees perform "user seal checks"..."? (FR 1240)

A. It is not OSHA's intent that each employee be continually monitored. Employers are required to take actions that will result in appropriate employee use. These actions consist of: rules with sanctions, training employees in the required use, and exercising reasonable care in monitoring the safety behavior of employees.

(g)(2)(i)

Q. What is meant by "...appropriate surveillance..."? (FR p.1240)

A. This means that employers are required to evaluate workplace conditions routinely so that they can provide additional respiratory protection or different respiratory protection, when necessary. By observing respirator use under actual workplace conditions, employers can note problems such as changes in the fit of a respirator due to protective equipment or conditions leading to skin irritation. The employer can then make adjustments to ensure that employees continue to receive appropriate respiratory protection.

(g)(2)(ii)

Q. When employees must leave the respirator use area where are they supposed to go? (FR p. 1241)

A. Employers must ensure that employees are allowed to leave the respirator use area in several circumstances. The intent of this requirement is to ensure that employees leave the area where respiratory protection is necessary when they need to remove the respirator or where it appears that the respirator is not functioning properly. The final standard stipulates that, in these circumstances, employees are to leave the "respirator use" area, which does not always equate with the work area or workplace. This language is intended to give employers the flexibility to establish safe areas in their workplaces that will minimize interruptions in work flow and production while ensuring that the area

where respirators are removed is free of respiratory hazards or contamination.

(g)(2)(iii)

Q. When do respirators have to be replaced or repaired? (FR p. 1241)

- A. The employer must replace, repair, or discard a respirator that is not functioning properly. This requirement applies in addition to the provisions in paragraphs (d) and (h) of this section that address the routine replacement of respirators and respirator parts. A malfunctioning or otherwise defective respirator must be replaced or repaired before the user returns to the work area. Employees must receive the necessary protection whenever they are in a respirator use area, and employers must ensure that employees in the respirator use area are wearing respirators that are in good working order. This is a performance-oriented approach to the replacement, repair, or discarding of respirators, and focuses on the need for respirators to function properly to provide protection to employees.

(g)(3)(i)

Q. For all IDLH entry, how many employees must be located outside an IDLH atmosphere.

- A. Environments containing IDLH atmospheres are frequently well-enough understood and controlled that a single standby person is adequate. In most fixed workplaces, the atmosphere is known, i.e., has been well defined either through analysis of monitoring results or through a process hazard analysis. In many industrial IDLH situations, only one respirator user is exposed to the IDLH atmosphere at a time, which means that a single standby person can easily monitor that employee's status. (when needed, the standard requires more than one employee outside) Even in situations where more than one respirator user is inside an IDLH atmosphere, a single standby person can often provide adequate communication and support. For example, in a small pump room or shed, even though two or three employees may be inside an IDLH atmosphere performing routine maintenance activities such as changing pump seals, one standby person can observe and communicate with all of them. In this type of situation, one standby person is adequate and appropriate, as long as the employee(s) outside is able to perform an effective rescue..

There are instances where more than one standby person is needed, however. The requirement for standby personnel is performance-oriented: "one employee or, when needed, more than one employee must be located outside the IDLH atmosphere." For example, to clean and paint the interior of a multi-level, multi-portal water tower, a process that often generates a deadly atmosphere as a result of cleaning solution and paint solvent vapors, employees often enter the tower through different portals to work on different levels. In such a situation, there will be a need for good communications at each entry portal, and more than one standby person would be needed to maintain adequate communication and accessibility.

(g)(3)(iv)

Q. What does OSHA require in the situation where the standby person must enter an IDLH atmosphere to provide emergency rescue? (FR p.1244)

A. The employer has flexibility in determining who will respond to such emergency rescue situations. The employer or authorized designee must be notified before the standby personnel undertake rescue activity and the employer or designee must then provide appropriate assistance for the particular situation. The employer must ensure that before entering an IDLH environment to provide emergency rescue, standby personnel notifies the employer or the employer's designee who has been authorized by the employer to provide necessary assistance that they are about to enter. The employer will have determined, in advance, as part of the written respirator program's worksite-specific procedures, the procedures that standby personnel will follow and whom they specifically need to notify in rescue situations. The employer's emergency response team may provide the necessary support, or other arrangements may have been made with local firefighting and emergency rescue personnel.

(g)(3)(v)

Q. Must the standby person(s) wait for a backup before beginning rescue operations? (FR p.1244)

A. Normally, standby personnel must contact the employer or employer's designee before undertaking any rescue activities in an IDLH atmosphere. The employer or authorized designee must take responsibility for ensuring that rescue operations are carried out appropriately, that rescuers are provided with proper respiratory equipment, and that employees are prepared to facilitate rescue attempts through proper preparation. However, the notification provision does not require standby employees to delay entry as they attempt to contact the employer or wait indefinitely for their employer or designee to respond to notification before entering the IDLH atmosphere when employees inside are in danger of succumbing and standby personnel are appropriately trained and equipped to provide assistance.

In the majority of cases, however, rescuers should not enter the IDLH environment until receiving some response to the notification that rescue is necessary, i.e., the employer or designee should know that the rescuers are entering, and emergency response units should be on their way to the incident.

Once the employer or designee has been notified the employer or designee who is authorized to do so must provide the necessary assistance appropriate to the situation. Such assistance does not always require that additional standby personnel enter the hazardous atmosphere. In some cases, the appropriate assistance could be, for example, the provision of emergency medical treatment. If standby employees do need to enter the

hazardous environment to perform rescue operations, however, the employer must ensure that those rescuers are fully protected.

(g)(3)(vi)

Q. What equipment must be available for rescue efforts? (FR p.1245)

- A. Standby personnel must have appropriate equipment to minimize the danger to themselves during rescue efforts. They must be equipped with pressure demand or other positive pressure SCBA, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA. The requirements that address appropriate retrieval equipment and means of rescue are written in performance-based language. Established rescue procedures are well-known, and retrieval equipment is readily available. Retrieval equipment must be used unless its use would increase the overall risk associated with entry into or rescue from the IDLH environment. Situations exist in which retrieval lines (harnesses, wristlets, anklets) may pose an entanglement problem, especially in areas in which air lines or electrical cords are present in the work areas in which the IDLH atmosphere occurs. Most of the time, however, rescue with retrieval equipment is effective, and much safer for the rescuers.

(g)(4)

Q. Who must comply with "two-in, two-out"?

- A. The Federal Respiratory Protection Standard applies directly to private sector workers engaged in firefighting, including those working in industrial fire brigades and private incorporated fire companies, and to Federal employees covered under Section 19 of the Occupational Safety and Health Act. Federal OSHA's jurisdiction does not extend to employees of State and local governments; however, States that have chosen to operate OSHA-approved occupational safety and health State plans are required to extend their jurisdiction to these workers. Therefore, **public sector firefighters are covered only in the 23 States and two Territories which have chosen to operate their own OSHA-approved State programs.** These States and Territories are: Alaska, Arizona, California, Connecticut, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington and Wyoming.

States with OSHA plans are required to adopt a standard at least as effective as the Federal standard within six months of Federal promulgation and must cover public sector employees. **Coverage of volunteers varies by State and depends on State law.** State and local government employees in States which do not operate OSHA-approved State plans are not covered by these requirements, unless the requirements are voluntarily adopted for local applicability.

Q. What is the difference between incipient stage firefighting and interior structural firefighting? How can one tell when the "two-in, two-out" requirement takes effect?

A. The "two-in, two-out" requirement does not take effect until firefighters begin to perform interior structural firefighting. Interior structural firefighting is firefighting to control or extinguish a fire in an advanced stage of burning inside a building. Because the fire is producing large amounts of smoke, heat and toxic products of combustion, exposure of firefighters is extremely hazardous and is considered an "immediately dangerous to life or health" (IDLH) environment.

Incipient stage firefighting, on the other hand, involves the control or extinguishment of a fire in the initial or beginning stage, using portable fire extinguishers or small hose lines without the need for personal protective equipment. Interior incipient fires expose firefighters to limited amounts of smoke and heat. Firefighters can approach and extinguish these fires without the need for self-contained breathing apparatus and, sometimes, without turnout gear.

It is the incident commander's responsibility, based on training and experience, to judge whether a fire is an interior structural fire, and how it will be attacked.

Q. If firefighters put on respiratory protection, does that mean that an Immediately Dangerous to Life or Health (IDLH) atmosphere exists, and that "two-in, two-out" applies?

A. Not necessarily. **Respiratory protection and "two-in, two-out" are required in all interior structural firefighting situations. Interior structural fires are considered to be IDLH atmospheres.** However, the use of respiratory protection does not, by itself, invoke the requirements associated with an IDLH atmosphere. The use of a self-contained breathing apparatus could be unrelated to exposure to an IDLH atmosphere associated with an interior structural fire. For example, many fire companies require that firefighters put on respiratory protection while on their way to the fire. It may later be determined that the fire is still in the incipient stage, and therefore not an IDLH atmosphere. It is only when firefighters are engaged in interior structural firefighting that the use of respirators is mandatory and the "two-in, two-out" requirement applies.

Q. Must the number of firefighters stationed outside always equal the number of firefighters sent inside to conduct interior structural firefighting?

A. No. There must always be at least two firefighters stationed outside during interior

structural firefighting, prepared to enter if necessary to rescue the firefighters inside. However, the incident commander has the flexibility to determine whether more than two outside firefighters are necessary when more than two firefighters go inside. In a situation where the burning structure is very large, additional outside firefighters may be warranted to ensure effective assistance and rescue. For example, where the firefighting involves entry from different locations or levels, two outside firefighters may have to be stationed at each point of entry.

Q. What duties may the outside firefighters perform in addition to monitoring the inside firefighters?

A. One of the outside firefighters must actively monitor the status of the inside firefighters and may not be assigned additional duties. The second outside firefighter may be involved in a wide variety of activities. Both of the outside personnel must be able to provide support and assistance to the two interior firefighters; any assignment of additional duties for the second firefighter must be weighed against the potential for interference with this requirement. OSHA cannot describe all specific compliance scenarios with a performance oriented standard. From OSHA's perspective, proper assignment of firefighting activities at an interior structural fire must be determined on a case-by-case basis and are dependent on the existing firefighting situation.

Some examples of other activities or duties that are commonly performed by firefighters and may be performed by one of the outside team members include: pump operations, incident command, the feeding and direction of hose to the entry team, hydrant operations, and outside hose line operation. Factors such as the distance of an individual from the entry point into the involved structure, training and equipment provided to the individual, and the existence of an immediate communication link between the individual and the firefighters entering the structure should be considered in making the assignment. Outside firefighters assigned additional duties must be able to immediately discontinue their other work assignments to perform rescue. Rescue and personal protective equipment must be available to outside firefighters so that there will be no delay in performing rescues. Compliance will always depend on consideration of all the worksite variables and conditions, and the judgement of the incident commander is critical in meeting this performance standard.

Q. Must firefighters wait until four workers are assembled before attempting to rescue victims inside the burning structure?

A. No. There is an explicit exemption in the respiratory protection standard that if life is in jeopardy, the "two-in, two-out" requirement is waived. The incident commander and the

firefighters at the scene must decide whether the risks posed by entering an interior structural fire prior to the assembly of at least four firefighters is outweighed by the need to rescue victims who are at risk of death or serious physical harm. There is no violation of the standard under rescue circumstances.

Q. Is "two-in, two-out" a staffing requirement?

A. No. The "two-in, two-out" requirement is and has been standard practice in the firefighting community for many years, and reflects only the number of firefighters who must be on the scene prior to initiating the interior attack on an interior structural fire. "Two-in, two-out" is strongly supported by an analysis of information from the International Association of Fire Fighters, the National Fire Protection Association, and existing OSHA standards and interpretations. OSHA's respiratory protection standard codifies recommended practice. It does not require fire departments to hire additional firefighters; it does not require four-person fire companies; it does not require four persons on a fire truck. Most fire departments have more than four firefighters and can assemble the numbers required on the scene by waiting for others to arrive. During this time the fire may be attacked from the outside, sizing-up operations may occur, and emergency rescue necessary to save lives may take place. Additional staff can be assembled by such means as calling for a second fire company at the scene, calling in additional firefighters who are on standby, and calling on other nearby fire departments when necessary. It is anticipated that small fire departments may rely on "mutual aid" agreements with neighboring jurisdictions to supply additional firefighters to assist with interior structural firefighting, if that is necessary to ensure compliance with "two-in, two-out." The intent of the "two-in, two-out" rule is a worker safety practice requirement, not a staffing requirement.

Paragraph (h) Maintenance and Care of Respirators

(h)(1)

- Q. Does OSHA require the employer to provide company time to employees to clean and maintain the respirators assigned for their exclusive use?(FR p. 1250)
- A. The employer is allowed to choose the cleaning and disinfecting program the best meets the requirements of the standard and the particular circumstances of the workplace. It is OSHA policy that if the employer elects to have employees clean their own respirators, the employer must provide the cleaning and disinfecting equipment, supplies, and facilities, as well as time for the job to be done. Failure to provide the equipment, supplies, facilities, or the on-the-job time to clean the respirators would be a violation of paragraph (h)(1).

(h)(1)

- Q. If an employer provides a respirator to an employee at the request of the employee(volunteer use) or in the event that the employee brings his/her own respirator into the workplace (volunteer use) must the respirator be cleaned and disinfected?
- A. Yes, cleaning and disinfection would be necessary so as to prevent the use of the respirator from presenting a health hazard to the employee using it. For example, an unsanitary respirator may pose a skin disorder to the employee wearing it.

(h)(1)

- Q. Can alcohol wipes be used to clean the inside of the face pieces of respirators?
- A. Yes, if permitted by the manufacturer of the respirator. It should be noted that Appendix B-2 of the standard has guidance on appropriate respirator cleaning and disinfecting procedures.

(h)(1)

- Q. What is meant by "equivalent effectiveness" when comparing cleaning and disinfection procedures found in Appendix B-2 versus the procedures recommended by the respirator manufacturer? (FR p.1248)
- A. "Equivalent effectiveness" simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

(h)(1)

Q. Who can clean and disinfect respirators? (FR p. 1249)

A. The employer is allowed to choose the cleaning and disinfecting program the best meets the requirements of the standard and the particular circumstances of the workplace. In other words, the employer can have respirators cleaned and repaired in a centralized type operation where respirators are passed out to employees OR the employer may require the respirator user to handle all cleaning and respirator maintenance functions. What ever method the employer chooses, respirator cleaning, disinfection, and repair activities must be performed by employees who are adequately trained in the proper respirator care procedures.

(h)(1)(i)

Q. Did OSHA intend a set time or frequency when it stated that respirators that are issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintain in a sanitary condition?(FR p. 1249)

A. The standard is written in performance language, so the decisions must be made on a case-by-case basis. The employer should pay particular attention to where the respirator is stored during breaks and lunch and the extent to which the respirator is protected between each wearing, to determine if the respirator is maintained in a sanitary condition. A respirator worn by employees working in a very dusty environment and left hanging on a nail in the workplace would need cleaning each time it is donned. The respirator must be checked and cleaned as often as necessary to ensure that the respirator continues to function properly.

(h)(2)(i)

Q. Is there any additional guidance as to what constitutes acceptable respirator storage conditions besides what is required in subparagraph (h)(2)(i) on storage?

A. Questions about appropriate storage of respirators, such as protection against excessive moisture, extreme temperatures, damaging chemicals, etc. can best be addressed by the employer contacting the respirator manufacturer to determine what if any additional specific recommendations are warranted for the workplace-specific use of the respirator(s).

(h)(2)(ii)(B)

Q. What is acceptable storage of emergency respirators such as SCBA' s used on fire trucks for firefighters? (FR p. 1250)

A. The standard allows emergency use respirators to be stored in compartments OR in covers, both of which must be clearly marked as containing the emergency respirators. Brackets with covers that are mounted on a wall or to a stable surface (e.g. on a fire

truck) may be used to store emergency respirators so long as the respirator is secured and covered to prevent damage when not in use.

(h)(3)

Q. What constitutes a minimally acceptable inspection of a respirator? (FR p. 1251)

A. For ALL respirators the employer must ensure that the following items are included in the visual inspection : a check of respirator function, tightness of connections and the condition of the various parts, including but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters, or filters, and a check of the respirator's elastic parts for pliability and signs of deterioration. At the minimum, the employer should follow the manufacturer's instructions that accompany the respirator.

Self-contained breathing apparatus (SCBA) type respirators require an inspection of the air and oxygen cylinders to assure that the cylinder pressure is maintained at or above 90% of the manufacturer's recommended pressure level and that the regulator and low pressure warning devices function properly. To assure that both the regulator and low pressure warning devices function properly the warning device must be activated and heard by the person performing the inspection.

For respirators that are available for emergency use: the employer must certify in writing, on a tag or label attached to the storage compartment, that an inspection was performed and include, the name (or signature) of the person who made the inspection, the findings of the inspection, any remedial action, and a serial number or other means of identifying the inspected respirator.

(h)(3)(i)(B) & (h)(3)(ii)(A)

Q. What is meant by "a check of respirator function" under paragraph (h)(3) dealing with respirator inspection?(FR p. 1251)

A. OSHA does not intend that the respirator be physically placed on the employee to ensure that it is working properly. Visual inspection can detect factors that would interfere with proper performance, e.g. distortion in shape (often the result of improper storage), missing or loose components, blockage, and improper connections. Alarms can also be examined without actually putting the respirator on the employee. In addition, examining elastic parts for pliability and signs of deterioration, as required in (h)(3)(ii)(B), can be performed without wearing the respirator.

(h)(3)(i)(C)

Q. What does OSHA require for the inspection of emergency escape-only type respirators?(FR p. 1251)

A. Emergency escape-only respirators must be inspected before being carried into the workplace for use. These types of respirators (e.g. mouthbit type respirators) are carried in by the individual worker into the workplace for personal use in an emergency, and must be inspected for proper condition prior to being carried into the workplace. The monthly inspections are no longer required.

(h)(3)(iii)

Q. Why was **90%** "of manufacturer's recommended pressure level" chosen as the minimum pressure level for SCBA's cylinders? (FR p. 1251)

A. OSHA selected the **90%** level to "ensure that sufficient air remains in the cylinder to allow emergency responders to perform their required duties in the contaminated or oxygen-deficient atmosphere, and still have air available to escape from these conditions." The **90%** level was also recommended by the American Industrial Hygiene Association.

(h)(3)(iii)

Q. Do the air or oxygen cylinders for SCBA's have to be inspected monthly even if they are not available for immediate use?

A. No, as long as the cylinders are out-of-service and not available for employees to use under any circumstances.

(h)(3)(iv)(A) & (B)

Q. Do the certification and tag or label requirements of these paragraphs apply to emergency escape type respirators that are stored in the workplace?

A. Yes.

(h)(4)

A. What is an example of a way of ensuring that respirators that fail an inspection or are otherwise found to be defective are removed from service and not used?(FR p.1252)

Q. The employer could use a tag system where a tag stating "out of service" is placed on the respirator to help ensure that a defective respirator is not inadvertently used.

(h)(4)(i)

Q. What would constitute an "appropriately trained" person who is responsible for performing repairs or adjustments to respirators?(FR p. 1252)

A. The use of the term ' appropriately trained' refers to an individual who has received training from the manufacturer or otherwise has demonstrated that he/she has the skills to return the respirator to its original state of effectiveness.

(h)(4)(iii)

Q. Can any employee repair the respirator reducing or admission valves?

A. No. These are two types of valves found in atmosphere-supplying respirators. They are used in conjunction with the respirator's regulator to provide the respirator wearer with proper pressure and flow of air supply. These valves serve such a critical function and the respirator standard requires that these parts be returned to the manufacturer or given to an appropriately trained technician for adjustment or repair.

Paragraph (i) Breathing air quality and use.

(i)(1)

Q. What are employers required to do to ensure that breathing air is of high purity? (FR p. 1252)

A. Paragraph(i) provides standard references which establish parameters for breathing air quality. Compressed and liquid oxygen are required to meet the specifications for breathing air outlined by the United States Pharmacopoeia (USP); compressed air, at a minimum, is required to meet the specifications outlined in the ANSI/Compressed Gas Association (CGA) Commodity Specification for Air, G-7.1-1989 for Grade D breathing air. Cylinders of purchased breathing air must have a certificate of analysis for purchased breathing air quality obtained through the supplier.

Q. What guidance is available for determining adequate air quantity and air flow for atmosphere-supplying respirators?

A. The NIOSH respirator certification standard, 42 CFR Part 84 can provide additional guidance. Compressed air sources must have the capacity to provide an adequate supply of breathing air. Since each airline respirator requires a minimum of 4-6 cubic feet per minute (cfm) air, compressed air sources should be sized to provide at least this amount of air for each respirator at the operating pressure specified for the particular respirator(s) in use. Proper air flow can then be verified by monitoring airline pressure. The NIOSH respirator certification process establishes the proper air pressure required for each particular respirator and airline combination. If the air pressure is within the proper range, the air flow should also be correct. For this reason, an air pressure gauge should be installed at the point where the airlines are connected to the air supply manifold.

Q. What are the minimum specifications for Grade D breathing air? (FR p. 1252 - 1253)

A. The ANSI/CGA G.7-1 - 1989 specifies the contents of Grade D breathing air as: oxygen (volume/volume) of 19.5 to 23.5 %; hydrocarbon (condensed) of 5 mg/m³ of air or less; carbon monoxide of 10 parts per million (ppm) or less; carbon dioxide of 1,000 ppm or less; and a lack of a noticeable odor.

(i)(2)

Q. Why is the use of compressed oxygen or utility oxygen prohibited in atmosphere-supplying respirator systems which have previously used compressed air? (FR p. 1253)

- A. The use of compressed air can introduce oil and grease into the air lines. This provision is intended to reduce the potential for fire and explosion which can occur where high pressure oxygen comes in contact with residual oil or grease.

(i)(3)

- Q. When may oxygen in greater concentrations than 23.5 % be used in supplied air systems? (FR p. 1253)

- A. To avoid the potential for fire and explosions, oxygen in greater concentration than 23.5% may only be used with equipment designed specifically for oxygen service or distribution.

(i)(4)(i)

- Q. What regulations apply to the handling, testing, and storage of cylinders used to supply breathing air to respirators? (FR p. 1253)

- A. Cylinders must be constructed, tested and maintained in accordance with the Shipping Container Specification Regulations of the Department of Transportation (DOT) 49 CFR Parts 173 and 178. These regulations are also required for NIOSH certification. The in-plant handling and storage of compressed gas cylinders must be in accordance with 29 CFR 1910.101(b) which incorporates by reference CGA Pamphlet P-1-1965.

(Note: Air receivers used to supply breathing air must be maintained in accordance with 29 CFR 1910.169 Air receivers.)

(i)(4)(ii)

- Q. Is the employer required to obtain a certificate of analysis from the supplier for every cylinder of breathing air that is purchased, documenting that the contents and quality meet the requirements of Grade D breathing air? (FR p. 1253)

- A. No, the supplier could provide one certificate for a lot or batch of cylinders that were all filled the same day, using the same source.

(i)(4)(iii)

- Q. If an air compressor used to fill breathing air cylinders does not meet the minimum moisture content in the cylinders(not to exceed the dew point of $-50^{\circ}\text{F}/-45.6^{\circ}\text{C}$ at 1 atmosphere pressure) will OSHA require the facility to purchase a new compressor to meet this specification?

- A. This requirement prevents respirator valves from freezing which can occur when excess moisture accumulates on the valves. Most compressors can be retrofitted with specially designed water traps similar to those used for air compressors supplying self-contained

underwater breathing apparatus (SCUBA) systems. Contact the manufacturer of the compressor to determine if this option is available.

(i)(5)

Q. Are there any restrictions on the placement of compressors supplying breathing air? (FR p. 1254)

A. Yes. The location of the compressor intake is critical to the purity of air supplied to the respirator user. The compressor must be located in an area uncontaminated by either combustion exhaust gases produced by vehicles or the compressor motor itself (if applicable), or by other gases from plant processes.

Q. OSHA requires compressors to be equipped with suitable in-line air-purifying sorbent beds and filters to ensure breathing air quality. What does "suitable" mean? Do all compressors which supply breathing air have to be equipped with sorbent beds and filters? (FR p. 1254)

A. The term suitable means that the compressor is capable of delivering a continuous supply of Grade D breathing air. On some compressors, especially those that are oil-lubricated, in-line sorbent beds and filters will need to be installed and maintained to ensure Grade D air. To further ensure breathing air quality, the air-purifying sorbent beds and filters must be changed according to the manufacturers' instructions. Other compressors, such as some ambient air movers, may be capable of delivering Grade D air without the addition of sorbent beds and filters.

Q. Tags that contain the signature of the person authorized by the employer to change the in-line sorbent beds and filters and the date of the change shall be maintained at the compressor. Must all the tags be retained under the OSHA recordkeeping requirements? (FR p.1254 - 1255)

A. No, only the tag containing the most recent change must be kept at the compressor.

(i)(6) & (7)

Q. Do all air compressors used to supply breathing air have to have a carbon monoxide alarm? (FR p. 1255 - 1257)

A. A compressor that is not oil lubricated is not required to have an alarm. However, the employer must ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm. Methods for ensuring that the carbon monoxide level does not exceed 10 ppm include the placement of the air intake for the compressor in an area known to be free

from contaminants, frequent or continuous monitoring of the breathing air supply, the use of carbon monoxide filters, or the use of high temperature alarms or shut off devices where necessary.

For an oil lubricated air compressor carbon monoxide can be produced where oil enters into the compression chamber and is partially combusted. Carbon monoxide can also enter the air intake for the compressor if the intake is not properly located. This type of compressor must have either a carbon monoxide alarm, high temperature alarm, or both. If only a high temperature alarm is used then the breathing air must be tested for the presence of carbon monoxide at intervals sufficient to ensure that carbon monoxide levels do not exceed 10 ppm.

Q. Is it required for an employer to monitor for the presence of carbon monoxide if the employer is using a oil-lubricated compressor equipped with a high temperature alarm or automatic shutoff device?

A. Yes, carbon monoxide which enters the compressor due to an improperly located air intake would not be detected by a high temperature alarm. Also, the location of high temperature alarms on air compressors can vary and are typically placed to protect the equipment from damage due to overheating. When the alarm sounds, depends on the location of the alarm sensor.

Q. What type of testing equipment is available to test for the presence of carbon monoxide?

A. Common methods of measuring carbon monoxide include the use of chemical detector tubes or direct reading instruments employing electrochemical sensors. When using a detector tube to test for the presence of carbon monoxide, either a "grab" sample of the breathing air may be tested or the air may be sampled directly using a specialized kit available by several manufacturers. The tube reading error for most low range carbon monoxide detector tubes ranges from 10 - 15 %. Electrochemical sensors can be used for periodic and continuous monitoring of breathing air for the level of carbon monoxide. These sensors must be calibrated periodically (typically on a monthly basis) to perform accurately. The measurement error reported for most electrochemical sensors is 5%.

Q. May the carbon monoxide filters with color-change indicators which convert carbon monoxide to carbon dioxide be used to detect the presence of carbon monoxide in breathing air? (FR p. 1255 - 1256)

A. No, the color change in the indicator is a warning of the presence of moisture in the

breathing air that is trapped in the filter. Moisture can render the filter ineffective. Thus, the color-change indicator cannot be used to detect the presence of carbon monoxide.

Q. How often should the employer test breathing air which is supplied by a compressor for the presence of carbon monoxide?

A. The frequency of monitoring will depend on the breathing air system in place in the facility, adherence to required maintenance procedures, and the location of the air intake for the compressor. For example, keeping in mind that a given measurement represents only that instant in time and must be representative of long-term air quality, periodic monitoring may be appropriate in situations where the compressor is well maintained and the air intake for the compressor is located in an area free from contaminants. In contrast, continuous monitoring would be warranted for older compressors where oil blow-by is more likely due to piston ring and cylinder wear, or in situations where rental compressors are used and/or the maintenance history is not known.

Q. Under the previous standard, OSHA required that the compressor be equipped with a "receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of compressor failure". Why was this provision dropped from the new standard? (FR p. 1254)

A. Paragraph (d)(2) of the new standard requires that respirators used in IDLH situations be either a SCBA or an airline respirator equipped with an auxiliary escape air supply. This requirement eliminates the need for a compressed air receiver. (Ambient air movers, small compressors that are not oil lubricated and have no air receiver, are considered to be compressors and fall under the requirements of paragraph (i)).

(i)(8)

Q. May the same air line couplings be used on both breathing air lines and worksite airlines used to pneumatically power other industrial equipment ? (FR p. 1257)

A. No, all couplings for breathing air must be incompatible with couplings and outlets for non-respirable compressed air and other gases used at your workplace. This provision is intended to prevent the cross-contamination and introduction of hazardous contaminants into breathing air lines.

Q. May nitrogen be used to purge or blow out the breathing air lines ? (FR p. 1257)

A. No, to prevent the contamination of breathing air lines with a non-respirable gas, the

standard specifically prohibits the introduction of an asphyxiating substance such as nitrogen into breathing air lines under any circumstance.

(i)(9)

- Q. May breathing gas containers be labeled in accordance with the American National Standard (ANSI) Method of Marking Portable Compressed Gas Containers to Identify the Material Contained, Z48.1-1954(Revised 1971)? (FR p. 1257)
- A. Yes, the standard requires that breathing gas containers be marked in accordance with the NIOSH respirator certification standard, 42 CFR Part 84. The ANSI standard as well as the Federal Specification BB-A-1034a, 1968, and the Federal Specification GC-13-00676b, 1976 have been incorporated by reference by NIOSH in 42 CFR Part 84.

Paragraph (j) Identification of filters, cartridges, and canisters

- Q. Why does OSHA require that the employer ensure that the NIOSH label is not removed, obscured, or defaced while in service?
- A. The NIOSH label serves several purposes. It ensures selection of appropriate filters for the contaminants encountered in the workplace and permits the employee using the respirator to check and confirm that the respirator has the appropriate filters before the respirator is used. Color coding and labeling allow fellow employees, supervisors, and the respirator program administrator to readily determine that the employee is using the appropriate filters.
- Q. Would dust, dirt, paint overspray, or other substances on the label cause the employer to be cited if the label is still legible?
- A. No. The label only needs to be legible. The employer may adopt whatever procedures are appropriate to ensure that the label remains on the filter and is not removed, defaced, or obscured during respirator usage.

Paragraph(k) Training and Information

(k) Introduction

Q. Is the annual retraining required by the standard expected to be a full retraining exercise?

A. The annual retraining must address each element required by this section. Emphasis in the training elements can vary based on the need of the worksite and knowledge of the workers.

Q. Does the standard specify the format or method of training?

A. The standard is performance oriented with respect to the format of training. The employer may use whichever training method is effective for the particular worksite provided the method addresses the required topics. Thus, the employer may use audiovisual and slide presentations, classroom discussion, informal discussions during safety meetings, etc., or a combination of these methods.

Q. May an employer use computer-mediated training?

A. Yes. However the employer must ensure that training is conducted in a manner that is understandable to the employee.

(k)(1)

Q. How can the employer comply with the section (k)(1) requirement that the employer ensure that the employee demonstrates an understanding of the information communicated during the training program ?

A. The employer can comply with this provision by asking the employee, either in writing or orally, about the required information and by observing the employee's hands-on use of respirators. The employer is not required to have written documentation.

(k)(1)(i)

Q. What type of information would be discussed when a employer explains to the employee why the respirator is necessary, as required in section (k)(1)(i) of the standard?

A. The type of information involved would include the nature, extent, and effects of the respiratory hazards. This includes identification of the hazardous chemicals involved, what contaminant levels the employee would breathe if no respiratory protection were used, and what the potential health effects of that exposure would be. Training

concerning the health effects of hazardous chemicals is also required under the Hazard Communication standard. Training under the Hazard Communication standard could help satisfy this portion of the training under the respirator standard.

(k)(1)(ii)

Q. What type of information would the employer transmit to the employee concerning the limitations and the capabilities of the respirator, as required in section (k)(1)(ii) of the standard?

A. A discussion of the limitations and capabilities of the respirator would address how the respirator operates. This would include an explanation of how the respirator provides protection by filtering the air, absorbing the vapor, or providing clean air from an uncontaminated source. Where appropriate, it should also include limitations on the equipment such as prohibitions against using air-purifying respirators in case of an emergency in IDLH atmosphere, and an explanation of why they should not be used in such situations.

(k)(1)(iii)

Q. What type of information must the employer provide concerning respirator use in emergency situations, as required in 29 CFR 1910.134(k)(1)(iii)?

A. The training program must discuss different emergency situations as appropriate to the facility such as respirator malfunctions, changes in work routines, and emergency situations that require the use of a different respirator.

(k)(1)(iv)

Q. What type of information would the employer transmit to the employee concerning how to inspect and check the respirator?

A. This would include the steps that employees are to follow if they discover any problems during the inspection, i.e., to whom they should report problems and where they can obtain replacement equipment if necessary. If the employer routinely has extensive inspections done by separate personnel then the standard does not require that individual respirator wearers be trained how to do full inspections. Training the employees in only those parts of the inspection process that they are expected to do is sufficient. The training must also include the procedures for donning and removing the respirator, checking the fit and seals, and using the respirator.

Employees are to be trained in how to check the respirator seal. Employers must train employees in the methods set forth in Appendix B or in alternative methods that are equally effective.

(k)(1)(v)

Q. How extensively must the employees be trained concerning the maintenance and storage of respirators?

A. Where employees perform some or all respirator maintenance and store respirators while not in use, detailed training in maintenance and storage procedures may be necessary. In other facilities, where specific personnel or central repair facilities are assigned to perform these activities, most employees may need only to be informed of the maintenance and storage procedures without having to learn significant technical information.

(k)(1)(vi)

Q. What type of information would the employer provide concerning recognition of the medical signs and symptoms that may limit or prevent the effective use of respirators as required in section (k)(1)(vi) of the standard?

A. The employer need only give employees medical information sufficient for them to recognize the symptoms of medical conditions that may affect their use of respirators. Examples of medical conditions and signs and symptoms that may affect an employee's ability to use a respirator are provided in Appendix C of the standard.

(k)(1)(vii)

Q. How extensive must the employer train employees on the general requirements of the standard as specified in 29 CFR 1910.134(k)(1)(vii)?

A. The discussion does not need to focus on all the details of the standard but could, for example, simply inform employees that employers are obligated to develop a written program, properly select respirators, evaluate respirator use, correct deficiencies in respirator use, conduct medical evaluations, provide for the maintenance, storage, and cleaning of respirators, and retain and provide access to specific records.

(k)(2)

Q. Section (k)(2) requires that the employer conduct training in a manner that is understandable to employees. How is the employer to accomplish this?

A. Employers are to develop training programs suitable to the employee's educational level and language background.

(k)(4)

Q. Under what circumstances is an employer allowed to wait before repeating training for a new employee?

A. This standard provides for limited "portability" of training. The employer may wait up to 12 months from an employee's previous training, if the employee demonstrates sufficient knowledge concerning the training elements in section (k)(1). This may be accomplished through a discussion with the employee and the previous employer.

(k)(5)

Q. Employees who are emergency responders as well as other employees who may use SCBAs may need training more than annually. Is this addressed in the standard?

A. The employer must assure that an employee can demonstrate knowledge of the elements specified in (k)(1)(i) through (vii). Employees who can not demonstrate such knowledge are to receive additional training even if they have received training within the last 12 months.

Q. Section (k)(5) requires retraining annually and in certain situations. Explain the certain situations.

A. The training for those situations is different from the annual retraining provisions of the standard. Retraining is needed only on those elements for which there exists a need to provide the retraining. For example, retraining with respect to the nature of the hazard may be necessary because of an increase in the workplace level of a hazardous substance. Retraining under section (k)(5) is required if a change in the written respirator program renders one or more of the elements listed in paragraph (k)(1) obsolete, thus requiring retraining in the elements affected. Retraining is also required on any program element of the section that is not sufficiently understood by the employee.

(k)(6)

Q. How often is the employer required to provide information to employees who voluntarily use respirators that are not required to be worn by the standard or by the employer?

A. Section (k)(6) requires that the employer initially provide the basic advisory information in Appendix D to employees who voluntarily use respirators that are not required by OSHA standards or the employer. Appendix D, a mandatory appendix may be used or alternatively, the employer may develop material that is equivalent in content to this appendix. This information may be transmitted either in written form or verbally. This information is not required to be provided other than initially.

Paragraph (l) Program Evaluation

(l)(1)

Q. How often should the respirator program be re-evaluated? (FR p. 1262)

A. Employers must review the written program and revise, as necessary, the written program elements specified in paragraph (c)(1) when workplace conditions affecting the use of respirators change. An annual written program review is not required, but instead a program review and revision is required as necessary based on workplace changes. Evaluation frequency is to be based on program complexity and on factors such as the nature and extent of workplace hazards, types of respirators in use, variability of workplace processes and operations, number of respirator users, and worker experience in the use of respirators. The employer must review respirator use in the workplace with sufficient frequency to ensure that continuous, successful implementation of all written respirator program elements prescribed under paragraph (c) is being achieved.

(l)(1)

Q. What must be reevaluated? (FR p. 1263)

A. The areas to be reevaluated include: whether the respirator program is achieving proper respirator fit, whether the appropriate respirators are being selected, and the proper use and maintenance of respirators. If respirators are not being used properly, the employer is required to correct any problems found during the assessment.

(l)(2)

Q. What type of information would be obtained from employees in the periodic assessment of the respirator program? (FR p. 1262)

A. The type of information involved includes difficulty with breathing or fatigue during respirator use, whether the respirator interferes with hearing, vision, communication, or job performance or restricts movement, whether the respirator causes discomfort, and whether the employee has confidence in the respirator's effectiveness. The employer must correct any problems that are revealed by the evaluation.

(l)(2)

Q. Is the presence of medical conditions part of the program evaluation? (FR p. 1264)

A. Identification of respirator-related medical conditions, such as skin irritation, would properly be part of the program evaluation. Employees identified during the evaluation as having skin irritation can either be referred to the PLHCP or be advised by the program

administrator about the need to leave the respirator use area as necessary to wash the face and face piece, as permitted by paragraph (g). It should be noted that final paragraph (e)(7)(iii) requires medical evaluation if observations made during the program evaluation indicate that such evaluation is necessary.

Paragraph (p) Revisions to Specific OSHA Standards

Q. Why is OSHA revising the respirator-related provisions of existing standards? (FR p. 1265)

A. The primary purpose of revising the respirator-related provisions of existing standards is to be consistent with OSHA's respiratory protection requirements. OSHA believes that uniformity will improve compliance with respiratory requirements, reduce the regulatory burden on employers, and enhance the protection for workers who use respiratory protection. Where appropriate, the respiratory protection requirements of future standards will refer to provisions of revised 29 CFR 1910.134 as well.

Q. Which specific standards are affected by the revision of 29 CFR 1910.134? (FR p. 1265, 1266)

A. Both industry-specific and substance-specific standards are affected by this revision. Specific standards that reference the Bureau of Mines and MSHA/NIOSH 30 CFR Part 11 for respirator certification or the ANSI Z88.2 - 1969 for respirator use requirements are updated to the recently published NIOSH regulation at 42 CFR Part 84 and the revised 29 CFR 1910.134 respectively. Standards that reflect this revision include 29 CFR 1910.94, 1910.111, 1910.156, 1910.252, 1910.261, 1926.57, and 1926.800.

In general, substance-specific standards that have provisions addressing respirator use, selection, and fit testing now reference the corresponding provisions of the revised 29 CFR 1910.134 (paragraph (b) Definitions; paragraph (c) Respiratory protection program; certain sections of paragraph (d) Selection of respirators; paragraph (f) Fit testing; paragraph (g) Use of respirators; paragraph (h) Maintenance and care of respirators; paragraph (i) Breathing air quality; paragraph (j) Identification of filters, cartridges, and canisters; paragraph (k) Training and information; paragraph (l) Program evaluation; and paragraph (m) Recordkeeping). Standards which reflect this revision include 29 CFR 1910.94, 1910.1001, 1910.1003 (this standard also references paragraph (e), the provision for medical evaluation), 1910.1017, 1910.1018, 1910.1025, 1910.1027, 1910.1028, 1910.1029, 1910.1043, 1910.1044, 1910.1045, 1910.1047, 1910.1048, 1910.1050, 1910.1051, 1910.1052, 1926.57, 1926.60, 1926.62, 1926.1101, and 1926.1127.

Q. Which portions of revised 29 CFR 1910.134 paragraph (d) have not been incorporated into the substance-specific standards? (FR p. 1267)

A. Revised paragraphs (d)(1)(iii) & (iv) and (d)(3) of 29 CFR 1910.134 have not been incorporated into the 13 Carcinogens standard, 29 CFR 1910.1003. In this standard there are no permissible exposure limits or other exposure criteria relevant to respirator

selection. In addition, paragraph (d)(1)(iii) of the revised 29 CFR 1910.134 has not been incorporated into any of the substance-specific standards. This paragraph requires employers to estimate exposures for respirator selection. The substance-specific standards already have requirements for exposure assessments that are more specific than those of paragraph (d)(1)(iii). Also, paragraphs (d)(3)(iii)(B)(1) and (2) of revised 29 CFR 1910.134 have not been incorporated into those substance-specific standards that already contain requirements for cartridge- and canister-change schedules (Vinyl Chloride, Benzene, Acrylonitrile, Formaldehyde, and 1,3-Butadiene). The change schedules in these substance-specific standards were based on the chemistry of the substances, exposure conditions, and respirator type and are more specific than the general requirements found in paragraph (d)(3)(iii)(B)(1) and (2).

Q. Are the tables in the substance-specific standards that specify requirements for respiratory selection affected by the revision? (FR p. 1203 - 1204, 1266)

A. No. The tables will remain unchanged in the substance-specific standards (29 CFR 1910.1001, 1910.1017, 1910.1018, 1910.1025, 1910.1027, 1910.1028, 1910.1029, 1910.1043, 1910.1044, 1910.1045, 1910.1047, 1910.1048, 1910.1050, 1910.1051, 1910.1052, 1926.60, 1926.62, 1926.1101, and 1926.1127) until OSHA's supplemental rulemaking on assigned protection factors is completed.

Q. In standards with a fit testing requirement, what is the frequency at which employees must now be fit tested? (FR p. 1266)

A. The revised standard requires annual fit testing.

Q. Will the revision of 29 CFR 1910.134 affect the medical evaluation requirements for the substance-specific standards?

A. Only the 13 Carcinogens standard (29 CFR 1910.1003) will be affected by the medical evaluation requirements of the revised 29 CFR 1910.134. The 13 Carcinogens standard did not contain medical evaluation requirements for employees who use respirators. OSHA incorporated paragraph (e) of the revised 29 CFR 1910.134 into the 13 carcinogens standard to conform with current industry practice and facilitate compliance with the respiratory protection requirements of 29 CFR 1910.1003. The remaining substance-specific standards have provisions for medical evaluation that are unique to a particular substance and, therefore these provisions were not changed to correspond to the medical evaluation requirements of the revised Respiratory Protection standard.

Q. Will the revision of 29 CFR 1910.134 affect substance-specific standards which contain specific fit testing procedures?

- A. Yes, the appendices and regulatory text addressing fit testing procedures will be removed from the affected substance-specific standards and replaced with a reference to Appendix A of the revised 29 CFR 1910.134. Substance-specific standards affected by this revision include Asbestos (29 CFR 1910.1001 and 1926.1101), Inorganic Arsenic (29 CFR 1910.1018), Lead (29 CFR 1910.1025 and 1926.62), Cadmium (29 CFR 1910.1027 and 1910.1127), Benzene (29 CFR 1910.1028), Acrylonitrile (29 CFR 1910.1045), Formaldehyde (29 CFR 1910.1048), Methylenedianiline (29 CFR 1910.1050 and 1926.60), 1,3-Butadiene (29 CFR 1910.1051), and Methylene chloride (29 CFR 1910.1052).

Note: CFR 1910.1029 (Coke Oven), CFR 1910.1043 (Cotton Dust), CFR 1910.1045 (DBCP), and CFR 1910.1047 (Ethylene Oxide) fit testing requirements have been improved with this revision.

Respirator Standard Appendix A

Fit Testing Procedures

- Q. May fit testing methods not listed in this appendix be used to comply with the fit testing requirements in section (f) of the standard?
- A. No. Section (f)(5) limits the acceptable fit testing methods to those listed in Appendix A.

Part I. OSHA Accepted Fit Test Protocols

- Q. How many respirators must be available for an employee to choose from when picking out their respirator?
- A. There must be enough models and sizes of respirators present so that the user can find a respirator that is acceptable and that fits correctly.
- Q. Why isn't the grimace required for a QLFT?
- A. The grimace is designed to temporarily break the face piece to face seal to test how well the respirator reseals itself if the seal is temporarily broken. A break in the seal during QLFT could cause sensory fatigue that would invalidate the results of the exercises, and if the grimace is performed as the last exercise, there will be no future testing to assess how well the respirator resealed.

B. Qualitative Fit Test Protocols (a)

- Q. How can an employer ensure that persons administering the QLFT are able to make up the solutions, calibrate the equipment and perform the tests properly, recognize invalid tests and ensure that test equipment is in proper working order?
- A. The employer must ensure the capabilities of the tester regardless of whether the tester works for the employer or for an outside contractor. This is a performance oriented provision giving the employer wide discretion. Some possibilities would include training an employee to perform the tests, hiring a credentialed professional to conduct the tests or learning to perform the tests and performing the tests himself or herself.
- (b)(5)
- Q. How can it be demonstrated that an isoamyl acetate (IAA) swab or ampule will generate a sufficient atmosphere of IAA that the swab or ampule can be used in place of the IAA soaked paper towel described in the appendix?

- A. The National Bureau of Standards found that the minimum IAA concentration in the chamber using the soaked towel method is 100 parts per million during fit testing. An employer who wishes to use test swabs or ampules will have to show that the swab or ampule in use generates a similar minimum concentration. The employer may rely on data obtained from the manufacturer of the swabs or ampules as long as the employer uses the products in a way that reproduces the concentrations obtained by the manufacturer under the original test conditions. Of course, the employer could conduct studies and generate company specific data, as well.

3.(a)(4), 4.(a)(4)

- Q. Does one have to use the DeVilbiss Model 40 inhalation medication nebulizer to spray the saccharin or the Bitrex test agent into the test chamber?

- A. No. The wording now allows the employer to use that nebulizer or an equivalent.

- Q. Since the irritant smoke method uses a toxic gas, how does OSHA intend to ensure the safety of the procedure?

- A. The preamble lists a large number of presenters at the hearings that presented data that the test can be done safely. Many felt that any risk to the employee during the test is outweighed by the efficaciousness of the test in assuring adequate respirator fit. However, it is very important that testers be properly trained to carry out this procedure. The preamble points out that conducting this test improperly is a violation of the standard.

(a)(3)

- Q. Why can't the irritant smoke protocol be performed in a test enclosure or hood?

- A. The irritant smoke method generates hydrogen chloride, a toxic material that can cause permanent lung damage at elevated concentrations. Therefore, this test must be done in a well ventilated area so that there is no build up of the hydrogen chloride concentration. It may never be performed in a test enclosure or hood.

(b)(1)

- Q. Does the irritant smoke protocol still require the use of an air pump that pumps 200 ml of air per minute through the smoke tube?

- A. No. The text also allows the use of an aspirator bulb. However, the preamble states that the aspirator should be squeezed in such a manner that it pumps 200 ml per minute through the tube. The tester should know the volume of air that the aspirator aspirates with each squeeze and squeeze the bulb the number of times per minute that will make the

flow 200 ml per minute. For example, if the aspirator pumps 50 ml of air with each squeeze, the tester should squeeze the bulb 4 times per minute.

Attachment 1

Apéndice D para la sección 1910.134 (Mandatorio)

Información Para los Empleados Que Usan los Respiradores Cuando No lo Exige el

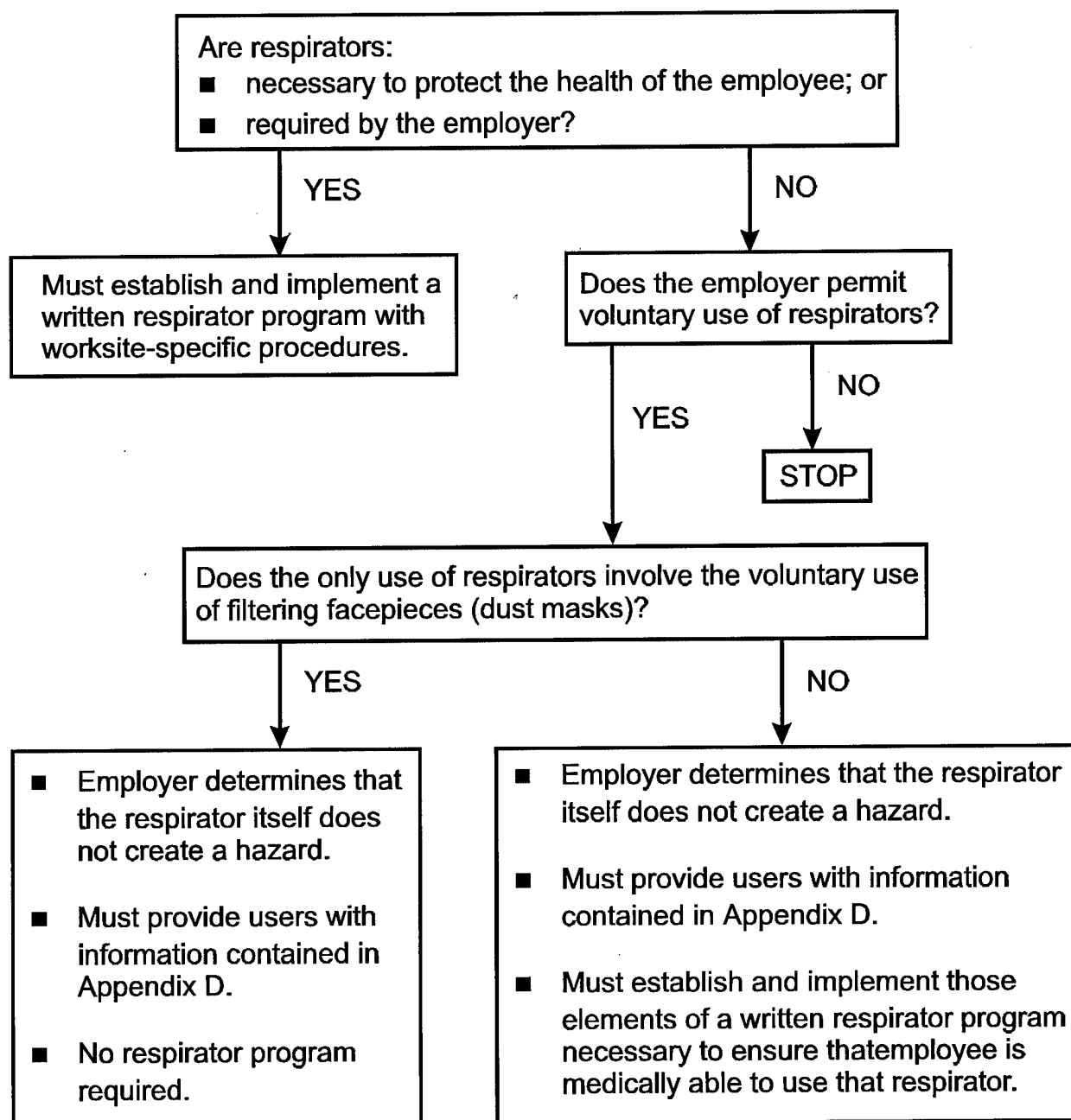
Reglamento o Norma

Los respiradores son uno de los medios de protección adecuados contra los distintos productos químicos cuando se han seleccionado y utilizado adecuadamente. Se fomenta el uso del respirador para el bienestar y protección del empleado, aun cuando la concentración de los productos químicos estén por debajo de los valores límites de exposición establecidos. Sin embargo, el respirador puede causarle daño si no se mantiene limpio o se usa incorrectamente. Algunas veces los empleados usan los respiradores para evitar ser expuestos a los diferentes productos químicos, aunque estos no excedan los valores límites establecidos por los reglamentos de la Administración de Seguridad y Salud Ocupacional (OSHA). Si su patrono provee los respiradores para uso voluntario, o si usted provee su propio respirador, necesita tomar ciertas precauciones para que se asegure que no corre riesgos cuando use el respirador.

Usted debe hacer lo siguiente:

1. Lea y haga caso a las instrucciones que provee el fabricante en el uso, mantenimiento, limpieza y cuidado, y las advertencias en cuanto a las limitaciones de los respiradores.
2. Escoja respiradores certificados contra los contaminantes que le interesa. La Institución Nacional para la Seguridad y Salud Ocupacional (NIOSH) del Departamento de Salud y Servicios Humanos de los Estados Unidos de América, son los que certifican los respiradores. Una etiqueta o certificado de exposición debe aparecer en el respirador o en el empaque del respirador. Este debe decirle para que químicos fue hecho y cuanto le va a proteger.
3. No use su respirador en atmósferas que contienen contaminantes para los cuales no fue diseñado porque no le va a proteger. Por ejemplo, si un respirador es diseñado para filtrar partículas de polvo no le va a proteger contra gases, vapores o partículas sólidas de vaho (mal olor) o humo.
4. No pierda de vista su respirador para que así no use el respirador de otra persona por equivocación.

Respirator-Use Requirements Flow Chart 29 CFR 1910.134(c)



Attachment 3

STATE LICENSING BOARDS

Alabama Board of Nursing

RSA Plaza
Suite 250
220 Washington Street
Montgomery, AL 36130-3900
Tel: 205-242-4060

Alaska Board of Nursing

Department of Commerce
PO Box 110806
Division of Occupational
Licensing
Juneau, AK 99811
Tel: 907-465-2544

Arizona Board of Nursing

1651 E. Morten Avenue
Suite 150
Phoenix, AZ 85020
Tel: 602-255-5092

**Arkansas State Board of
Nursing**

University Tower Building
1123 S. University Avenue
Suite 800
Little Rock, AR 72204
Tel: 501-686-2700

**California Board of
Registered Nursing**

400 "R" Street
Suite 4030
Sacramento, CA 95814
Tel: 916-322-3350

Colorado Board of Nursing

1560 Broadway, Suite 670
Denver, CO 80202
Tel: 303-894-2430

**Connecticut Department of
Health Services Nurse Licensure**

150 Washington Street
Hartford, CT 06106
Tel: 203-566-1032/1036

Delaware Board of Nursing

Cannon Building
PO Box 1401
Dover, DE 19903
Tel: 302-739-4522

**District of Columbia Nurses
Examining Board**

614 H St., NW
Room 904
Washington, DC 20001
Tel: 202-727-7454/7461

Florida Board of Nursing

111 E. Coastline Drive
Suite 516
Jacksonville, FL 32202
Tel: 904-359-6331

Georgia Board Of Nursing

166 Pryor Street, SW
Suite 400
Atlanta, Georgia 30303
Tel: 404-659-3943

Idaho Board of Nursing

280 N. 8th Street
Suite 210
PO Box 83720
Boise, ID 83702
Tel: 208-334-3110

**Indiana State Nurses
Association**

402 W. Washington Street
Room 041
Indianapolis, IN 46204
Tel: 317-232-2960

Kansas State Board of Nursing

900 SW Jackson
Landon State Office Building
Suite 551 S
Topeka, KS 66612-1230
Tel: 913-296-4929

Louisiana Board of Nursing

912 Pere Marquette Building
150 Baronne Street
Room 912
New Orleans, LA 70112
Tel: 504-568-5464

Maryland Board of Nursing

4201 Patterson Avenue
Baltimore, MD 21215
Tel: 410-764-5124

Michigan Board of Nursing

PO Box 30018
Lansing, MI 48909
Tel: 517-373-1600

Hawaii Board of Nursing

PO Box 3469
Honolulu, HI 96801
Tel: 808-586-3000

**Illinois Department of
Professional Regulation**

320 W. Washington Street
Springfield, IL 62786
Tel: 217-785-0800

Iowa Board of Nursing

1223 East Court
Des Moines, IA 50319
Tel: 515-281-3255
Tel: 317-232-2960

Kentucky Board of Nursing

312 Whittington Parkway
Suite 300
Louisville, KY 40222-5172
Tel: 502-329-7000

Maine Board of Nursing

35 Anthony Avenue
State House Station 158
Augusta, ME 04333
Tel: 207-624-5275

**Massachusetts Board of
Registration in Nursing**

100 Cambridge Street
Room 1519
Boston, MA 02202
Tel: 617-727-9961

Minnesota Board of Nursing

2829 University Avenue SE
Suite 500
Minneapolis, MN 55414-3253
Tel: 612-617-2270

Mississippi Board of Nursing

239 N. Lamar
Suite 401
Jackson, MS 39201-1397
Tel: 601-359-6170

Montana Board of Nursing

Arcade Building-Lower Level
111 N. Jackson
PO Box 200513
Helena, MT 59620-0513
Tel: 406-444-2071

Nevada Board of Nursing

PO Box 46886
Las Vegas, NV 89114
Tel: 702-739-1575

New Jersey Board of Nursing

PO Box 45010
Newark, NJ 07101
Tel: 201-504-6430

North Carolina Board of Nursing

PO Box 2129
Raleigh, NC 27602
Tel: 919-782-3211

**New York Board of Nursing
State Education Department**

Cultural Education Center
Albany, NY 12230
Tel: 518-474-3843

Ohio Board of Nursing

77 South High Street
17th Floor
Columbus, OH 43266-0316
Tel: 614-466-3947

Missouri Board of Nursing

PO Box 656
3605 Missouri Boulevard
Jefferson City, MO 65102
Tel: 314-751-0681

Nebraska Board of Nursing

PO Box 95007
Lincoln, NE 68509
Tel: 402-471-2115

**New Hampshire Board of
Nursing**

Division of Public Health Services
6 Hazen Drive
Concord, NH 03301-6527
Tel: 603-271-2323

New Mexico Board of Nursing

Granada Square
4253 Montgomery N.E.
Suite 130
Albuquerque, New Mexico
87109-1100
Tel: 505-841-8340

**North Dakota Board of
Nursing**

919 S. 7th Street
Suite 504
Bismarck, ND 58504-5881
Tel: 701-224-2974

Oklahoma Board of Nursing

2915 Classen Boulevard
Suite 524
Oklahoma City, OK 73106
Tel: 405-525-2076

Oregon Board of Nursing
800 NE Oregon Street #25
Suite 465
Portland, OR 97232
Tel: 503-731-4745

**Rhode Island Board of Nursing
Registration and Nursing
Education**
Three Capitol Hill
Cannon Building
Room 104
Providence, RI 02908
Tel: 401-277-2827

South Dakota Board of Nursing
3307 South Lincoln
Sioux Falls, SD 57105-5224
Tel: 605-335-4973

Texas Board of Nurse Examiners
Box 140466
Austin, TX 78714
Tel: 512-835-4880

Vermont Board of Nursing
109 State Street
Montpelier, VT 05609-1106
Tel: 802-828-2396

Washington Nursing Commission
PO Box 1099
Olympia, WA 98507-1099
Tel: 360-753-2686

Wisconsin Board of Nursing
PO Box 8935
Madison, WI 53708
Tel: 608-266-0257

**Pennsylvania Board of
Nursing**
PO Box 2649
Harrisburg, PA 17105-2649
Tel: 717-783-7142

**South Carolina Nurses
Association Board of
Nursing**
220 Executive Center Drive
Suite 220
Columbia, SC 29210
Tel: 803-731-1648

Tennessee Board of Nursing
283 Plus Park boulevard
Nashville, TN 37247-1010
Tel: 615-367-6232

**Utah Board of Nursing
Division of Professional
Licensing**
160 E. 300 South
PO Box 45805
Salt Lake City, UT 84145
Tel: 801-530-6628

Virginia Board of Nursing
6606 W. Broad Street
4th Floor
Richmond, VA 23230-1717
Tel: 804-662-9909

**West Virginia Board of
Examiners for RN's**
101 Dee Drive
Charleston, WV 25311-1620
Tel: 304-558-3596

Wyoming Board of Nursing
Barrett Building
2nd Floor
2301 Central Avenue
Cheyenne, WY 82002
Tel: 307-777-7601

Attachment 4

Appendix C to 1910.134: OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____

2. Your name: _____

3. Your age (to nearest year): _____

4. Sex (circle one): Male Female

5. Your height: _____ ft. _____ in.

6. Your weight: _____ lbs.

7. Your job title: _____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire

(include the Area Code): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes No

11. Check the type of respirator you will use (you can check more than one category):

a. _____ N, R, or P disposable respirator (filter-mask, non-cartridge type only).

b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes No

If "yes," what type(s): _____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes No

2. Have you ever had any of the following conditions?
 - a. Seizures (fits): Yes No
 - b. Diabetes (sugar disease): Yes No
 - c. Allergic reactions that interfere with your breathing: Yes No
 - d. Claustrophobia (fear of closed-in places): Yes No
 - e. Trouble smelling odors (except when you had a cold): Yes No

3. Have you ever had any of the following pulmonary or lung problems?
 - a. Asbestosis: Yes No
 - b. Asthma: Yes No
 - c. Chronic bronchitis: Yes No
 - d. Emphysema: Yes No
 - e. Pneumonia: Yes No
 - f. Tuberculosis: Yes No
 - g. Silicosis: Yes No
 - h. Pneumothorax (collapsed lung): Yes No
 - i. Lung cancer: Yes No
 - j. Broken ribs: Yes No
 - k. Any chest injuries or surgeries: Yes No
 - l. Any other lung problem that you've been told about: Yes No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
 - a. Shortness of breath: Yes No
 - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes No
 - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes No
 - d. Have to stop for breath when walking at your own pace on level ground: Yes No
 - e. Shortness of breath when washing or dressing yourself: Yes No
 - f. Shortness of breath that interferes with your job: Yes No
 - g. Coughing that produces phlegm (thick sputum): Yes No
 - h. Coughing that wakes you early in the morning: Yes No
 - i. Coughing that occurs mostly when you are lying down: Yes No
 - j. Coughing up blood in the last month: Yes No
 - k. Wheezing: Yes No
 - l. Wheezing that interferes with your job: Yes No
 - m. Chest pain when you breathe deeply: Yes No
 - n. Any other symptoms that you think may be related to lung problems: Yes No

5. Have you ever had any of the following cardiovascular or heart problems?
 - a. Heart attack: Yes No
 - b. Stroke: Yes No
 - c. Angina: Yes No
 - d. Heart failure: Yes No
 - e. Swelling in your legs or feet (not caused by walking): Yes No
 - f. Heart arrhythmia (heart beating irregularly): Yes No
 - g. High blood pressure: Yes No
 - h. Any other heart problem that you've been told about: Yes No

6. Have you ever had any of the following cardiovascular or heart symptoms?
- | | | |
|---|-----|----|
| a. Frequent pain or tightness in your chest: | Yes | No |
| b. Pain or tightness in your chest during physical activity: | Yes | No |
| c. Pain or tightness in your chest that interferes with your job: | Yes | No |
| d. In the past two years, have you noticed your heart skipping or missing a beat: | Yes | No |
| e. Heartburn or indigestion that is not related to eating: | Yes | No |
| f. Any other symptoms that you think may be related to heart or circulation problems: | Yes | No |
7. Do you currently take medication for any of the following problems?
- | | | |
|--------------------------------------|-----|----|
| a. Breathing or lung problems: | Yes | No |
| b. Heart trouble: | Yes | No |
| c. Blood pressure: | Yes | No |
| d. Seizures (fits): | Yes | No |
8. Has your wearing a respirator caused any of the following problems? (If you've never used a respirator, check the following space ___ and go to question 9:)
- | | | |
|---|-----|----|
| a. Eye irritation: | Yes | No |
| b. Skin allergies or rashes: | Yes | No |
| c. Anxiety that occurs only when you use the respirator: | Yes | No |
| d. Unusual weakness or fatigue: | Yes | No |
| e. Any other problem that interferes with your use of a respirator: | Yes | No |
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes No
- Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.**
10. Have you ever lost vision in either eye (temporarily or permanently): Yes No
11. Do you currently have any of the following vision problems?
- | | | |
|---|-----|----|
| a. Wear contact lenses: | Yes | No |
| b. Wear glasses: | Yes | No |
| c. Color blind: | Yes | No |
| d. Any other eye or vision problem: | Yes | No |
12. Have you ever had an injury to your ears, including a broken ear drum: Yes No
13. Do you currently have any of the following hearing problems?
- | | | |
|--|-----|----|
| a. Difficulty hearing: | Yes | No |
| b. Wear a hearing aid: | Yes | No |
| c. Any other hearing or ear problem: | Yes | No |
14. Have you ever had a back injury: Yes No
15. Do you currently have any of the following musculoskeletal problems?
- | | | |
|--|-----|----|
| a. Weakness in any of your arms, hands, legs, or feet: | Yes | No |
| b. Back pain: | Yes | No |
| c. Difficulty fully moving your arms and legs: | Yes | No |
| d. Pain or stiffness when you lean forward or backward at the waist: | Yes | No |
| e. Difficulty fully moving your head up or down: | Yes | No |
| f. Difficulty fully moving your head side to side: | Yes | No |
| g. Difficulty bending at your knees: | Yes | No |
| h. Difficulty squatting to the ground: | Yes | No |

- i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes No
 j. Any other muscle or skeletal problem that interferes with using a respirator: Yes No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes No
 If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes No

If "yes," name the chemicals if you know them: _____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

- | | | |
|---|-----|----|
| a. Asbestos: | Yes | No |
| b. Silica (e.g., in sandblasting): | Yes | No |
| c. Tungsten/cobalt (e.g., grinding or welding this material): | Yes | No |
| d. Beryllium: | Yes | No |
| e. Aluminum: | Yes | No |
| f. Coal (for example, mining): | Yes | No |
| g. Iron: | Yes | No |
| h. Tin: | Yes | No |
| i. Dusty environments: | Yes | No |
| j. Any other hazardous exposures: | Yes | No |

If "yes," describe these exposures: _____

4. List any second jobs or side businesses you have: _____

5. List your previous occupations: _____

6. List your current and previous hobbies: _____

7. Have you been in the military services? Yes No
 If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes No

8. Have you ever worked on a HAZMAT team? Yes No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes No

If "yes," name the medications if you know them: _____

10. Will you be using any of the following items with your respirator(s)?
a. HEPA Filters: Yes No
b. Canisters (for example, gas masks): Yes No
c. Cartridges: Yes No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
a. Escape only (no rescue): Yes No
b. Emergency rescue only: Yes No
c. Less than 5 hours per week: Yes No
d. Less than 2 hours per day: Yes No
e. 2 to 4 hours per day: Yes No
f. Over 4 hours per day: Yes No

12. During the period you are using the respirator(s), is your work effort:

a. Light (less than 200 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

b. Moderate (200 to 350 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. Heavy (above 350 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.
Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and or equipment (other than the respirator) when you're using your respirator: Yes No

If "yes," describe this protective clothing and or equipment: _____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes No

15. Will you be working under humid conditions: Yes No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator:

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

Apéndice C: Cuestionario de Evaluación Médico obligado por la OSHA
(La agencia de seguridad y salud ocupacional)
Parte 29 CFR 1910.134 Mandatorio para Protección del Sistema Respiratorio

Marque con un círculo para indicar sus respuestas a cada pregunta.

Para el empleado: Puede usted leer (circule uno): Sí o No

Su patrón debe dejarlo responder estas preguntas durante horas de trabajo o en un tiempo y lugar que sea conveniente para usted. Para mantener este cuestionario confidencial, su patrón o supervisor no debe ver o revisar sus respuestas. Su patrón debe informarle a quien dar o enviar este cuestionario para ser revisado por un profesional de sanidad con licencia autorizado por el estado.

Parte A. Sección 1. (Mandatorio). La siguiente información debe de ser proveida por cada empleado que ha sido seleccionado para usar cualquier tipo de respirador (escriba claro por favor).

1. Fecha : _____
2. Nombre: _____
3. Edad: _____
4. Su sexo (circule uno) Masculino o Femenino
5. Altura: _____ pies _____ pulgadas
6. Peso: _____ libras
7. Su ocupación, título o tipo de trabajo: _____
8. Número de teléfono al donde pueda ser llamado por un profesional de sanidad con licencia que revisara este cuestionario (incluya el área): _____
9. Indique la hora mas conveniente para llamarle a este numero: _____
10. ¿Le ha informado su patrón como comunicarse con el profesional de sanidad con licencia que va a revisar este cuestionario (circule una respuesta)? Sí o No
11. Anote el tipo de equipo protector respiratorio que va utilizar (puede anotar mas de una categoría)
 - a. _____ Respirador disponible de clase N, R, o P (por ejemplo: respirador de filtro mecánico, respirador sin cartucho)
 - b. _____ Otros tipos (respirador con cartucho químico, máscara con cartucho químico, máscara con manguera con soplador (PAPR), máscara con manguera sin soplador (SAR), aparato respiratorio autónomos (SCBA)).
12. ¿Ha usado algun tipo de respirador ? Sí o No
Si ha usado equipo protector respiratorio, que tipo(s) ha utilizado:

Parte A. Sección 2. (Mandatorio): Preguntas del 1 al 9 deben ser contestadas por cada empleado que fue seleccionado a usar cualquier tipo de respirador. Marque con un círculo para indicar sus repuestas.

1. ¿Corrientemente fuma tabaco, o ha fumado tabaco durante el ultimo mes? Sí o No

2. ¿Ha tenido algunas de las siguientes condiciones medicas?
 - a. Convulsiones : Sí o No
 - b. Diabetes (azucar en la sangre): Sí o No
 - c. Reacciones alergicas que no lo deja respirar: Sí o No
 - d. Claustrofobia (miedo de estar en espacios cerrados): Sí o No
 - e. Dificultad oliendo excepto cuando ha cogido un resfriado: Sí o No

3. ¿Ha tenido algunas de los siguientes problemas pulmonares?
 - a. Asbestosis: Sí o No
 - b. Asma: Sí o No
 - c. Bronquitis cronica: Sí o No
 - d. Emfisema: Sí o No
 - e. Pulmonía: Sí o No
 - f. Tuberculosis: Sí o No
 - g. Silicosis: Sí o No
 - h. Neumotorax (pulmon colapsado): Sí o No
 - i. Cáncer en los pulmones: Sí o No
 - j. Costillas quebradas: Sí o No
 - k. Injuria o cirugía en el pecho: Sí o No
 - l. Algun otro problema de los pulmones que le ha dicho su medico: Sí o No

4. ¿Corrientemente tiene alguno de los siguientes síntomas o enfermedades en sus pulmones?
 - a. Respiración dificultosa Sí o No
 - b. Respiración dificultosa cuando camina rapido sobre terreno plano o subiendo una colina: Sí o No
 - c. Respiración dificultosa cuando camina normalmente con otras personas sobre terreno plano: Sí o No
 - d. Cuando camina normalmente en terreno plano se encuentra corto de resuello? Sí o No
 - e. Respiración dificultosa cuando se esta bañando o vistiendo: Sí o No
 - f. Respiración dificultosa que lo impede trabajar: Sí o No
 - g. Tos con flema: Sí o No
 - h. Tos que lo despierta temprano en la mañana: Sí o No
 - i. Tos que ocurre cuando esta acostado: Sí o No
 - j. Ha tosido sangre en el ultimo mes: Sí o No
 - k. Silbar o respirar con mucha dificultad: Sí o No
 - l. Silbar que lo impede trabajar: Sí o No
 - m. Dolor del pecho cuando respira profundamente: Sí o No
 - n. Otros síntomas que crea usted estar relacionados a los pulmones: Sí o No

5. ¿Ha tenido algunos de los siguientes problemas con el corazón?
 - a. Ataque cardiaco: Sí o No
 - b. Ataque cerebrovascular: Sí o No
 - c. Dolor en el pecho: Sí o No
 - d. Falla de corazón: Sí o No
 - e. Hinchazón en las piernas o pies (que no sea por caminar): Sí o No
 - f. Latidos irregulares del corazón: Sí o No
 - g. Alta presión: Sí o No
 - h. Algun otro problema cardio-vascular o cardiaco: Sí o No

6. ¿Ha tenido algunos de los siguientes síntomas causados por su corazón?
 - a. Dolor de pecho frecuente o pecho apretado: Sí o No
 - b. Dolor o pecho apretado durante actividad fisica: Sí o No

- c. Dolor o pecho apretado que no lo deja trabajar normalmente: Sí o No
- d. En los últimos dos años ha notado que su corazón late irregularmente: Sí o No
- e. Dolor en el pecho o indigestión que no es relacionado a la comida: Sí o No
- f. Algunos otros síntomas que usted piensa ser causado por problemas de su corazón o de su circulación.
. Sí o No

7. ¿Esta tomando medicina por alguno de los siguientes problemas?

- a. Respiración dificultosa: Sí o No
- b. Problemas del corazón: Sí o No
- c. Alta presión : Sí o No
- d. Convulsiones: Sí o No

8. ¿Le ha causado alguno de los siguientes problemas usando el respirador? (si no ha usado un respirador, deje esta pregunta en blanco __ y continúe con pregunta 9).

- a. Irritación de los ojos: Sí o No
- b. Alergias del cutis o sarpullido: Sí o No
- c. Ansiedad que ocurre solamente cuando usa el respirado: Sí o No
- d. Debilidad, falta de vigor o fatiga des acostumbrada: Sí o No
- e. Algun otro problema que le impida utilizar su respirador: Sí o No

9. ¿Le gustaría hablar con el profesional de sanidad con licencia autorizado por el estado que revisara este cuestionario sobre sus respuestas? Sí o No

Las preguntas del 10 al 15 deben ser contestadas por los empleados seleccionados para usar una máscara con cartucho químico o aparato respiratorio autónomo (SCBA). Los empleados que usan otro tipo de respirador no tienen que contestar estas preguntas.

10. ¿Ha perdido la vista en cualquiera de sus ojos (temporalmente o permanente): Sí o No

11. ¿Corrientemente tiene algunos de los siguientes problemas con su vista?

- a. Usa lentes de contacto: Sí o No
- b. Usa lentes: Sí o No
- c. Daltoniano (dificultad distinguiendo colores): Sí o No
- d. Tiene algún problema con sus ojos o su vista: Sí o No

12. ¿Ha tenido daño en sus oídos incluyendo rotura del tímpano: Sí o No

13. ¿Corrientemente tiene uno de las siguientes problemas para oír?

- a. Dificultad oyendo: Sí o No
- b. Usa un aparato para oír: Sí o No
- c. Tiene algun otro problema con sus oídos o dificultad escuchando: Sí o No

14. ¿Se ha dañado o lastimado su espalda? Sí o No

15. ¿Tiene uno de los siguientes problemas de su aparato muscular or esqueleto?

- a. Debilidad en sus brazos, manos, piernas o pies : Sí o No
- b. Dolor de espalda: Sí o No
- c. Dificultad para mover sus brazos y piernas completamente: Sí o No
- d. Dolor o engarrotamiento cuando se inclina para adelante o para atras: Sí o No
- e. Dificultad para mover su cabeza para arriba o para abajo completamente: Sí o No
- f. Dificultad para mover su cabeza de lado a lado: Sí o No
- g. Dificultad para agacharse doblando sus rodillas: Sí o No
- h. Dificultad para agacharse hasta tocar el piso: Sí o No
- i. Dificultad subiendo escaleras cargando mas de 25 libras: Sí o No
- j. Alguno problema muscular o con sus huesos que le evite usar un respirador: Sí o No

Parte B - Las siguientes preguntas pueden ser agregadas al cuestionario a discrecion del profesional de sanidad con licencia autorizado por el estado.

1. ¿Esta trabajando en las alturas arriba de 5,000 pies o en sitios que tienen menos oxígeno de lo normal? Sí o No

Si la respuesta es "Sí", se ha sentido mareado, o ha tenido dificultad respirando, palpitaciones, o cualquier otro síntoma que usted no tiene cuando no esta trabajando bajo estas condiciones: Sí o No

2. ¿En el trabajo o en su casa, ha estado expuesto a solventes o contaminantes peligrosos en el aire (por ejemplo, humos, neblina o polvos) o ha tenido contacto del cutis con químicas peligrosas? Sí o No
Escriba las químicas y productos con las que ha estado expuesto, si sabe cuales

son: _____

3. ¿Ha trabajado con los siguientes materiales o las condiciones anotadas abajo?:

- | | |
|--|---------|
| a. Asbestos: | Sí o No |
| b. Sílice (Limpiar mediante un chorro de arena): | Sí o No |
| c. Tungsteno/Cobalto (pulverizar o soldadura): | Sí o No |
| d. Berilio: | Sí o No |
| e. Aluminio: | Sí o No |
| f. Carbón de piedra (minando): | Sí o No |
| g. Hierro: | Sí o No |
| h. Estaño: | Sí o No |
| i. Ambiente polvoriento: | Sí o No |
| j. Otra exposicion peligrosa: | Sí o No |

Describa las exposiciones peligrosas:

4. ¿Tiene usted otro trabajo o un negocio aparte de este?

5. Apunte su previos trabajos:

6. Apunte sus pasatiempos:

7. ¿Tiene servicio militar?Sí o No
Si la respuesta es "Sí", ha estado expuesto a agentes químicos o biologicos durante entrenamiento o combate:Sí o No

8. ¿Alguna vez ha trabajado en un equipo de HAZMAT (equipo respondedor a incidentes de materiales peligrosos con emergencia)?Sí o No

9. ¿Esta tomando alguna medicina que no haya mencionado en este cuestionario (incluyendo remedios caseros o medicinas que compra sin receta)? Sí o No

Si la respuesta es "Sí", cuales son _____

10. ¿Va a usar algunas de las siguientes partes con su respirador?

- a. filtros HEPA (filtro de alta eficiencia que remueve partículas tóxicas en la atmósfera): Sí o No
- b. Canastillo (por ejemplo, máscara para gas): Sí o No
- c. Cartuchos: Sí o No

11. ¿Cuántas veces espera usar un respirador?

- a. Para salir de peligro solamente (no rescates): Sí o No
- b. Recates de emergencia solamente: Sí o No
- c. Menos de 5 horas *por semana*: Sí o No
- d. Menos de 2 horas *por día*: Sí o No
- e. 2 a 4 horas *por día*: Sí o No
- f. Mas de 4 horas *por día*: Sí o No

12. ¿Durante el tiempo de usar el respirador, su trabajo es...?

a. **Ligero** (menos de 200 kcal por hora): Sí o No

Si la respuesta es "sí", cuanto tiempo dura la obra _____ horas _____ minutos

Ejemplos de trabajos ligeros: estar sentado escribiendo, escribiendo a máquina, diseñando, trabajando la línea de montaje, o estar parado gobernando un taladro o máquinas:

b. **Moderado** (200-350 kcal por hora): Sí o No

Si la respuesta es "sí" cuanto tiempo dura en promedio por jornada _____ horas _____ minutos

Ejemplos de trabajos moderados : sentado clavando o archivando; manejando un camión o autobús en trafico pesado; estar de pie taladrando, clavando, trabajando la línea de montaje, o transferiendo una carga (de 35 libras) a la altura de la cintura; caminando sobre tierra plana a 2 millas por hora o bajando a 3 millas por hora; empujando una carretilla con una carga pesada (de 100 libras) sobre terreno plano.

c. **Pesado** (mas de 350 kcal por hora): Sí o No

Si la respuesta es "sí" cuanto tiempo dura en promedio por jornada _____ horas _____ minutos

Ejemplos de trabajos pesados: levantando cargas pesadas (mas de 50 libras) desde el piso hasta la altura de la cintura o los hombros; trabajando cargando o descargando; transpalear; estar de pie trabajando de albañil o demenuzando moldes; subiendo a 2 millas por hora; subiendo la escalera con una carga pesada (mas de 50 libras).

13. ¿Va a estar usando ropa o equipo protectivo cuando use el respirador? Sí o No

Si la respuesta es "sí" describa que va a estar usando _____

14. ¿Va a estar trabajando en condiciones calurosas (temperatura mas de 77 grados F)? Sí o No

15. ¿Va a estar trabajando en condiciones húmedas? Sí o No

16. Describa el tipo de trabajo que va a estar usted haciendo cuando use el respirador.

17. Describa cualquier situacion especial o peligrosa que pueda encontrar cuando este usando el respirador (por ejemplo, espacios encerrados, gases que lo puedan matar, etc.)

18. Provea la siguiente informacion si la sabe, por cada sustancia tóxica que usted va a estar expuesto cuando este usando el respirador(s):

Nombre de la primera sustancia tóxica _____

Maximo nivel de exposición por jornada de trabajo _____

Tiempo de exposición por jornada _____

Nombre de la segunda sustancia tóxica _____

Maximo nivel de exposición por jornada de trabajo _____

Tiempo de exposición por jornada _____

Nombre de la tercera sustancia tóxica _____

Máximo nivel de exposición por jornada de trabajo _____

Tiempo de exposición por jornada _____

El nombre de cualquier sustancia tóxica que usted va a estar expuesto cuando este usted usando el
respirador _____

19. Describa alguna responsabilidad especial que usted va a tener cuando usted este usado el respirador(s) que pueda afectar la seguridad o la vida de otros (por ejemplo, rescate, seguridad).

APPENDIX IV
Small Entity Compliance Guide:
Sample Respiratory Protection Program

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Small Entity Compliance Guide: Sample Respiratory Protection Program

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This Sample Respiratory Protection Program is for demonstration purposes only. XYZ Seating is not intended to represent an actual company. XYZ is a hypothetical company that has chosen to interpret certain provisions of 29 CFR 1910.134 in ways that could be different from the way another company might choose to implement it.

1.0 Purpose

XYZ Seating has determined that employees in the Prep, Coating, Assembly, and Maintenance departments are exposed to respiratory hazards during routine operations. These hazards include wood dust, particulates, and vapors, and in some cases represent Immediately Dangerous to Life or Health (IDLH) conditions. The purpose of this program is to ensure that all XYZ Seating employees are protected from exposure to these respiratory hazards.

Engineering controls, such as ventilation and substitution of less toxic materials, are the first line of defense at XYZ Seating; however, engineering controls have not always been feasible for some of our operations, or have not always completely controlled the identified hazards. In these situations, respirators and other protective equipment must be used. Respirators are also needed to protect employees' health during emergencies. The work processes requiring respirator use at XYZ Seating are outlined in Table 1 in the Scope and Application section of this program.

In addition, some employees have expressed a desire to wear respirators during certain operations that do not require respiratory protection. As a general policy XYZ Seating will review each of these requests on a case-by-case basis. If the use of respiratory protection in a specific case will not jeopardize the health or safety of the worker(s), XYZ Seating will provide respirators for voluntary use. As outlined in the Scope and Application section of this program, voluntary respirator use is subject to certain requirements of this program.

2.0 Scope and Application

This program applies to all employees who are required to wear respirators during normal work operations, and during some non-routine or emergency operations such as a spill of a hazardous substance. This includes employees in the Prep, Coating (Spray Booth), Assembly, and Maintenance departments. All employees working in these areas and engaged in certain processes or tasks (as outlined in the table below) must be enrolled in the company's respiratory protection program.

In addition, any employee who voluntarily wears a respirator when a respirator is not required (i.e., in certain maintenance and coating operations) is subject to the medical evaluation, cleaning, maintenance, and storage elements of this program, and must be provided with certain information specified in this section of the program.¹

¹ Employees who voluntarily wear filtering facepieces (dust masks) are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

Employees participating in the respiratory protection program do so at no cost to them. The expense associated with training, medical evaluations and respiratory protection equipment will be borne by the company.

TABLE 1: VOLUNTARY AND REQUIRED RESPIRATOR USE AT XYZ SEATING	
Respirator	Department/Process
Filtering facepiece (dust mask)	Voluntary use for warehouse workers
Half-facepiece APR or PAPR with P100 filter	Prep and Assembly Voluntary use for maintenance workers when cleaning spray booth walls or changing spray booth filter
SAR, pressure demand, with auxiliary SCBA	Maintenance - dip coat tank cleaning
Continuous flow SAR with hood	Spray booth operations Prep (cleaning)*
Half-facepiece APR with organic vapor cartridge	Voluntary use for Dip Coat Tenders, Spray Booth Operators (gun cleaning), and Maintenance workers (loading coating agents into supply systems)
Escape SCBA	Dip Coat, Coatings Storage Area, Spray Booth Cleaning Area

* until ventilation is installed.

3.0 Responsibilities

Program Administrator

The Program Administrator is responsible for administering the respiratory protection program. Duties of the program administrator include:

- C Identifying work areas, processes or tasks that require workers to wear respirators, and evaluating hazards.
- C Selection of respiratory protection options.
- C Monitoring respirator use to ensure that respirators are used in accordance with their certifications.
- C Arranging for and/or conducting training.
- C Ensuring proper storage and maintenance of respiratory protection equipment.

- C Conducting qualitative fit testing with Bitrex.
- C Administering the medical surveillance program.
- C Maintaining records required by the program.
- C Evaluating the program.
- C Updating written program, as needed.

The Program Administrator for Company XYZ Seating is _____.

Supervisors

Supervisors are responsible for ensuring that the respiratory protection program is implemented in their particular areas. In addition to being knowledgeable about the program requirements for their own protection, supervisors must also ensure that the program is understood and followed by the employees under their charge. Duties of the supervisor include:

- C Ensuring that employees under their supervision (including new hires) have received appropriate training, fit testing, and annual medical evaluation.
- C Ensuring the availability of appropriate respirators and accessories.
- C Being aware of tasks requiring the use of respiratory protection.
- C Enforcing the proper use of respiratory protection when necessary.
- C Ensuring that respirators are properly cleaned, maintained, and stored according to the respiratory protection plan.
- C Ensuring that respirators fit well and do not cause discomfort.
- C Continually monitoring work areas and operations to identify respiratory hazards.
- C Coordinating with the Program Administrator on how to address respiratory hazards or other concerns regarding the program.

Employees

Each employee has the responsibility to wear his or her respirator when and where required and in the manner in which they were trained. Employees must also:

- C Care for and maintain their respirators as instructed, and store them in a clean sanitary location.
- C Inform their supervisor if the respirator no longer fits well, and request a new one that fits properly.
- C Inform their supervisor or the Program Administrator of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.

4.0 Program Elements

Selection Procedures

The Program Administrator will select respirators to be used on site, based on the hazards to which workers are exposed and in accordance with all OSHA standards. The Program Administrator will conduct a hazard evaluation for each operation, process, or work area where airborne contaminants may be present in routine operations or during an emergency. The hazard evaluation will include:

- 1) Identification and development of a list of hazardous substances used in the workplace, by department, or work process.
- 2) Review of work processes to determine where potential exposures to these hazardous substances may occur. This review shall be conducted by surveying the workplace, reviewing process records, and talking with employees and supervisors.
- 3) Exposure monitoring to quantify potential hazardous exposures. Monitoring will be contracted out. XYZ Seating currently has a contract with ABC Industrial Hygiene Services to provide monitoring when needed.

The results of the current hazard evaluation are the following:

(Table 3 at the end of this program contains the sampling data that this section was based on.)

Prep-sanding: Ventilation controls on some sanders are in place, but employees continue to be exposed to respirable wood dust at 2.5 - 7.0 mg/m³ (8 hour time-weighted-average, or TWA). Half-facepiece APRs with P100 filters and goggles are required for employees sanding wood pieces. PAPRs will be available for employees who are unable to wear an APR.

Prep-cleaning: Average methylene chloride exposures measured at 70 ppm based on 8 hr. TWA exposure results for workers cleaning/stripping furniture pieces. Ventilation controls are planned, but will not be implemented until designs are completed and a contract has been let for installation of the controls. In the meantime, employees must wear supplied air hoods with continuous air flow, as required by the Methylene Chloride standard 1910.1052.

Coating-spray booth: XYZ Seating has decided to take a conservative approach and require all employees to wear supplied air respirators when working inside the spray booth. Based on exposure data in published reports on the same type of spray booth operations, the Program Administrator has determined that an SAR in the continuous flow mode will provide sufficient protection. Spray booth employees may opt to wear half-facepiece APRs with organic vapor cartridges when cleaning spray guns.

Coating-dip coat, and drying: Exposures are kept within PELs by ventilation, and employees generally enter the dip coat area for short time periods (up to one hour). Vapors could leak into the dip coat and drying areas if the ventilation system is not running at peak efficiency. Odors in this area are often unpleasant even at the levels maintained by the ventilation system. While XYZ Seating notes that respiratory protection is not required in this area, the company recognizes employee concern about breathing vapors and about having to work in an unpleasant environment. Accordingly, employees may voluntarily choose to wear a half-facepiece APR with organic vapor cartridges when working in this area.

Assembly: Ventilation controls on sanders are in place, but employees continue to be exposed to respirable wood dust at 2.5 - 6.0 mg/m³ (8 hour TWA); half-facepiece APRs with P100 filters and goggles are required for employees sanding wood pieces in the assembly department. PAPRs will be available for employees who are unable to wear an APR. The substitution for aqueous-based glues will eliminate exposures to formaldehyde, methylene chloride, and epoxy resins.

Maintenance: Because of potential IDLH conditions, employees cleaning dip coat tanks must wear a pressure demand SAR during the performance of this task.

Employees may voluntarily wear half-facepiece APRs with P100 cartridges when cleaning spray booth walls or changing booth filters and half-facepiece APRs with organic vapor cartridges when loading coating agents into supply systems. Although exposure monitoring has shown that exposures are kept within PELs during these procedures, XYZ Seating will provide respirators to workers who are concerned about potential exposures.

Updating the Hazard Assessment

The Program Administrator must revise and update the hazard assessment as needed (i.e., any time work process changes may potentially affect exposure). If an employee feels that respiratory protection is needed during a particular activity, he/she is to contact his or her supervisor or the Program Administrator. The Program Administrator will evaluate the potential hazard, arranging for outside assistance as necessary. The Program Administrator will then communicate the results of that assessment back to the employees. If it is determined that respiratory protection is necessary, all other elements of this program will be in effect for those tasks and this program will be updated accordingly.

NIOSH Certification

All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of that certification. Also, all filters, cartridges, and canisters must be labeled with the appropriate NIOSH approval label. The label must not be removed or defaced while it is in use.

Voluntary Respirator Use

XYZ Seating will provide respirators at no charge to employees for voluntary use for the following work processes:

- C Employees may wear half-facepiece APRs with organic vapor cartridges while working in the dip coat area.
- C Warehouse workers may wear filtering facepieces.
- C Spray Booth Operators may wear half-facepiece APRs with organic vapor cartridges while cleaning spray guns.
- C Maintenance personnel may wear half-facepiece APRs with P100 cartridges while cleaning spray booth walls, and organic vapor cartridges while loading spray guns.

The Program Administrator will provide all employees who voluntarily choose to wear either of the above respirators with a copy of Appendix D of the standard. (Appendix D details the requirements for voluntary use of respirators by employees.) Employees choosing to wear a half facepiece APR must comply with the procedures for Medical Evaluation, Respirator Use, and Cleaning, Maintenance and Storage.

The Program Administrator shall authorize voluntary use of respiratory protective equipment as requested by all other workers on a case-by-case basis, depending on specific workplace conditions and the results of the medical evaluations.

Medical Evaluation

Employees who are either required to wear respirators, or who choose to wear an APR voluntarily, must pass a medical exam before being permitted to wear a respirator on the job. Employees are not permitted to wear respirators until a physician has determined that they are medically able to do so. Any employee refusing the medical evaluation will not be allowed to work in an area requiring respirator use.

A licensed physician at ABC medical clinic, where all company medical services are provided, will provide the medical evaluations. Medical evaluation procedures are as follows:

- C The medical evaluation will be conducted using the questionnaire provided in Appendix C of the respiratory protection standard. The Program Administrator will provide a copy of this questionnaire to all employees requiring medical evaluations.

- C To the extent feasible, the company will assist employees who are unable to read the questionnaire (by providing help in reading the questionnaire). When this is not possible, the employee will be sent directly to the physician for medical evaluation.
- C All affected employees will be given a copy of the medical questionnaire to fill out, along with a stamped and addressed envelope for mailing the questionnaire to the company physician. Employees will be permitted to fill out the questionnaire on company time.
- C Follow-up medical exams will be granted to employees as required by the standard, and/or as deemed necessary by the ABC medical clinic physician.
- C All employees will be granted the opportunity to speak with the physician about their medical evaluation, if they so request.
- C The Program Administrator has provided the ABC medical clinic physician with a copy of this program, a copy of the Respiratory Protection standard, the list of hazardous substances by work area, and for each employee requiring evaluation: his or her work area or job title, proposed respirator type and weight, length of time required to wear respirator, expected physical work load (light, moderate, or heavy), potential temperature and humidity extremes, and any additional protective clothing required.
- C Any employee required for medical reasons to wear a positive pressure air purifying respirator will be provided with a powered air purifying respirator.
- C After an employee has received clearance and begun to wear his or her respirator, additional medical evaluations will be provided under the following circumstances:
 - C Employee reports signs and/or symptoms related to their ability to use a respirator, such as shortness of breath, dizziness, chest pains, or wheezing.
 - C The ABC medical clinic physician or supervisor informs the Program Administrator that the employee needs to be reevaluated;
 - C Information from this program, including observations made during fit testing and program evaluation, indicates a need for reevaluation;
 - C A change occurs in workplace conditions that may result in an increased physiological burden on the employee.

A list of XYZ Seating employees currently included in medical surveillance is provided in Table 2 of this program.

All examinations and questionnaires are to remain confidential between the employee and the physician.

Fit Testing

Fit testing is required for employees wearing half-facepiece APRs for exposure to wood dust in Prep and Assembly, and maintenance workers who wear a tight-fitting SAR for dip tank cleaning. Employees voluntarily wearing half-facepiece APRs may also be fit tested upon request.

Employees who are required to wear half-facepiece APRs will be fit tested:

- C Prior to being allowed to wear any respirator with a tight fitting facepiece.
- C Annually.
- C When there are changes in the employee's physical condition that could affect respiratory fit (e.g., obvious change in body weight, facial scarring, etc.).

Employees will be fit tested with the make, model, and size of respirator that they will actually wear. Employees will be provided with several models and sizes of respirators so that they may find an optimal fit. Fit testing of PAPRs is to be conducted in the negative pressure mode.

The Program Administrator will conduct fit tests following the OSHA approved Bitrex Solution Aerosol QLFT Protocol in Appendix B (B4) of the Respiratory Protection standard.

The Program Administrator has determined that QNFT is not required for the respirators used under current conditions at XYZ Seating. If conditions affecting respirator use change, the Program Administrator will evaluate on a case-by-case basis whether QNFT is required.

Respirator Use

Respiratory protection is required for the following personnel:

TABLE 2: XYZ Seating Personnel in Respiratory Protection Program			
Name	Department	Job Description/ Work Procedure	Respirator
Joe Apple	Prep	Operator	Half mask APR P100 filter when sanding/ SAR continuous flow hood for cleaning
Ron Carey	Maintenance	Dip tank cleaning	SAR, pressure demand with auxiliary SCBA
Lisa Jones	Coating	Spray Booth Operator	SAR, continuous flow hood

General Use Procedures:

- C Employees will use their respirators under conditions specified by this program, and in accordance with the training they receive on the use of each particular model. In addition, the respirator shall not be used in a manner for which it is not certified by NIOSH or by its manufacturer.
- C All employees shall conduct user seal checks each time that they wear their respirator. Employees shall use either the positive or negative pressure check (depending on which test works best for them) specified in Appendix B-1 of the Respiratory Protection Standard.
- C All employees shall be permitted to leave the work area to go to the locker room to maintain their respirator for the following reasons: to clean their respirator if the respirator is impeding their ability to work, change filters or cartridges, replace parts, or to inspect respirator if it stops functioning as intended. Employees should notify their supervisor before leaving the area.

- C Employees are not permitted to wear tight-fitting respirators if they have any condition, such as facial scars, facial hair, or missing dentures, that prevents them from achieving a good seal. Employees are not permitted to wear headphones, jewelry, or other articles that may interfere with the facepiece-to-face seal.

Emergency Procedures:

The following work areas have been identified as having foreseeable emergencies:

Spray Booth Cleaning Area - spill of hazardous waste
Dip Coat Area - malfunction of ventilation system, leak in supply system
Coatings Storage Area - spill or leak of hazardous substances

When the alarm sounds, employees in the affected department must immediately don their emergency escape respirator, shut down their process equipment, and exit the work area. All other employees must immediately evacuate the building. XYZ Seating's Emergency Action Plan describes these procedures (including proper evacuation routes and rally points) in greater detail.

Emergency escape respirators are located:

Locker #1 in the Spray Booth Area
Storage cabinet #3 in Dip Coat/Drying Area
Locker #4 in the Coatings Storage Area

Respiratory protection in these instances is for escape purposes only. XYZ Seating employees are not trained as emergency responders, and are not authorized to act in such a manner.

Respirator Malfunction

1. APR Respirator Malfunction:

For any malfunction of an APR (e.g., such as breakthrough, facepiece leakage, or improperly working valve), the respirator wearer should inform his or her supervisor that the respirator no longer functions as intended, and go to the designated safe area to maintain the respirator. The supervisor must ensure that the employee receives the needed parts to repair the respirator, or is provided with a new respirator.

2. Atmosphere-supplying Respirator Malfunction:

All workers wearing atmosphere-supplying respirators will work with a buddy. Buddies shall assist workers who experience an SAR malfunction as follows:

If a worker in the spray booth experiences a malfunction of an SAR, he or she should signal to the buddy that he or she has had a respirator malfunction. The buddy shall don an emergency escape respirator and aid the worker in immediately exiting the spray booth.

Workers cleaning wood pieces or assembled furniture in the Prep department will work with a buddy. If one of the workers experiences a respirator malfunction, he/she shall signal this to their buddy. The buddy must immediately stop what he or she is doing to escort the employee to the Prep staging area where the employee can safely remove the SAR.

IDLH Procedures

The Program Administrator has identified the following area as presenting the potential for IDLH conditions:

Dip Coat Tank Cleaning:

Maintenance workers will be periodically required to enter the dip tank to perform scheduled or unscheduled maintenance. In such cases, workers will follow the permit required confined space entry procedures specified in the XYZ Seating Confined Space Program. As specified in these procedures, the Program Administrator has determined that workers entering this area shall wear a pressure demand SAR. In addition, an appropriately trained and equipped standby person shall remain outside the dip tank and maintain constant voice and visual communication with the worker. In the event of an emergency requiring the standby person to enter the IDLH environment, the standby person shall immediately notify the Program Administrator and will proceed with rescue operations in accordance with rescue procedures outlined in the XYZ Seating Confined Space Program.

Air Quality

For supplied-air respirators, only Grade D breathing air shall be used in the cylinders. The Program Administrator will coordinate deliveries of compressed air with the company's vendor, Compressed Air Inc., and require Compressed Air Inc. to certify that the air in the cylinders meets the specifications of Grade D breathing air.

The Program Administrator will maintain a minimum air supply of one fully charged replacement cylinder for each SAR unit. In addition, cylinders may be recharged as necessary from the breathing air cascade system located near the respirator storage area. The air for this system is

provided by XYZ Seating's supplier, and deliveries of new air are coordinated by the Program Administrator.

Cleaning, Maintenance, Change Schedules and Storage

Cleaning

Respirators are to be regularly cleaned and disinfected at the designated respirator cleaning station located in the employee locker room.

Respirators issued for the exclusive use of an employee shall be cleaned as often as necessary, but at least once a day for workers in the Prep and Assembly departments.

Atmosphere supplying and emergency use respirators are to be cleaned and disinfected after each use.

The following procedure is to be used when cleaning and disinfecting respirators:

- C Disassemble respirator, removing any filters, canisters, or cartridges.
- C Wash the facepiece and associated parts in a mild detergent with warm water. Do not use organic solvents.
- C Rinse completely in clean warm water.
- C Wipe the respirator with disinfectant wipes (70% Isopropyl Alcohol) to kill germs.
- C Air dry in a clean area.
- C Reassemble the respirator and replace any defective parts.
- C Place in a clean, dry plastic bag or other air tight container.

Note: The Program Administrator will ensure an adequate supply of appropriate cleaning and disinfection material at the cleaning station. If supplies are low, employees should contact their supervisor, who will inform the Program Administrator.

Maintenance

Respirators are to be properly maintained at all times in order to ensure that they function properly and adequately protect the employee. Maintenance involves a thorough visual inspection for cleanliness and defects. Worn or deteriorated parts will be replaced prior to use. No components will be replaced or repairs made beyond those recommended by the manufacturer. Repairs to regulators or alarms of atmosphere-supplying respirators will be conducted by the manufacturer.

The following checklist will be used when inspecting respirators:

- C Facepiece:
 - cracks, tears, or holes
 - facemask distortion
 - cracked or loose lenses/faceshield

- C Headstraps:
 - breaks or tears
 - broken buckles

- C Valves:
 - residue or dirt
 - cracks or tears in valve material

- C Filters/Cartridges:
 - approval designation
 - gaskets
 - cracks or dents in housing
 - proper cartridge for hazard

- C Air Supply Systems:
 - breathing air quality/grade
 - condition of supply hoses
 - hose connections
 - settings on regulators and valves

Employees are permitted to leave their work area to perform limited maintenance on their respirator in a designated area that is free of respiratory hazards. Situations when this is permitted include to wash their face and respirator facepiece to prevent any eye or skin irritation, to replace the filter, cartridge or canister, and if they detect vapor or gas breakthrough or leakage in the facepiece or if they detect any other damage to the respirator or its components.

Change Schedules

Employees wearing APRs or PAPRs with P100 filters for protection against wood dust and other particulates shall change the cartridges on their respirators when they first begin to experience difficulty breathing (i.e., resistance) while wearing their masks.

Based on discussions with our respirator distributor about XYZ Seating's workplace exposure conditions, employees voluntarily wearing APRs with organic vapor cartridges shall change the

cartridges on their respirators at the end of each work week to ensure the continued effectiveness of the respirators.

Storage

Respirators must be stored in a clean, dry area, and in accordance with the manufacturer's recommendations. Each employee will clean and inspect their own air-purifying respirator in accordance with the provisions of this program and will store their respirator in a plastic bag in their own locker. Each employee will have his/her name on the bag and that bag will only be used to store that employee's respirator.

Atmosphere supplying respirators will be stored in the storage cabinet outside of the Program Administrator's office.

The Program Administrator will store XYZ's supply of respirators and respirator components in their original manufacturer's packaging in the equipment storage room.

Defective Respirators

Respirators that are defective or have defective parts shall be taken out of service immediately. If, during an inspection, an employee discovers a defect in a respirator, he/she is to bring the defect to the attention of his or her supervisor. Supervisors will give all defective respirators to the Program Administrator. The Program Administrator will decide whether to:

- C Temporarily take the respirator out of service until it can be repaired.
- C Perform a simple fix on the spot such as replacing a headstrap.
- C Dispose of the respirator due to an irreparable problem or defect.

When a respirator is taken out of service for an extended period of time, the respirator will be tagged out of service, and the employee will be given a replacement of similar make, model, and size. All tagged out respirators will be kept in the storage cabinet inside the Program Administrator's office.

Training

The Program Administrator will provide training to respirator users and their supervisors on the contents of the XYZ Seating Respiratory Protection Program and their responsibilities under it, and on the OSHA Respiratory Protection standard. Workers will be trained prior to using a respirator in the workplace. Supervisors will also be trained prior to using a respirator in the workplace or prior to supervising employees that must wear respirators.

The training course will cover the following topics:

- C the XYZ Seating Respiratory Protection Program
- C the OSHA Respiratory Protection standard
- C respiratory hazards encountered at XYZ Seating and their health effects
- C proper selection and use of respirators
- C limitations of respirators
- C respirator donning and user seal (fit) checks
- C fit testing
- C emergency use procedures
- C maintenance and storage
- C medical signs and symptoms limiting the effective use of respirators

Employees will be retrained annually or as needed (e.g., if they change departments and need to use a different respirator). Employees must demonstrate their understanding of the topics covered in the training through hands-on exercises and a written test. Respirator training will be documented by the Program Administrator and the documentation will include the type, model, and size of respirator for which each employee has been trained and fit tested.

5.0 Program Evaluation

The Program Administrator will conduct periodic evaluations of the workplace to ensure that the provisions of this program are being implemented. The evaluations will include regular consultations with employees who use respirators and their supervisors, site inspections, air monitoring and a review of records.

Problems identified will be noted in an inspection log and addressed by the Program Administrator. These findings will be reported to XYZ Seating management, and the report will list plans to correct deficiencies in the respirator program and target dates for the implementation of those corrections.

6.0 Documentation and Recordkeeping

A written copy of this program and the OSHA standard is kept in the Program Administrator's office and is available to all employees who wish to review it.

Also maintained in the Program Administrator's office are copies of training and fit test records. These records will be updated as new employees are trained, as existing employees receive refresher training, and as new fit tests are conducted.

The Program Administrator will also maintain copies of the medical records for all employees covered under the respirator program. The completed medical questionnaire and the physician's documented findings are confidential and will remain at ABC Medical Clinic. The company will only retain the physician's written recommendation regarding each employee's ability to wear a respirator.

TABLE 3: XYZ SEATING HAZARD ASSESSMENT - JUNE 1998

Department	Contaminants	Exposure Level (8 hrs TWA)*	PEL	Controls
Prep: Sanding	wood dust	2.5 - 7.0 mg/m ³	5 mg/m ³ (TLV= 1 mg/m ³)	Local exhaust ventilation (LEV) for sanders. Half- facepiece APR with P100 filter.
Prep: Cleaning	methylene chloride	70 ppm	25 ppm 125 ppm = STEL	LEV to be installed for cleaning stations. Continuous flow SAR hood until then needed for respiratory protection. Will reevaluate after LEV installation.
	methanol	150 ppm	200 ppm	
	acetone	400 ppm	1,000 ppm	
Coating: Spray booth painting	toluene	(300 ppm)**	200 ppm 500 ppm = 10 min peak	Continuous flow SAR hood
	xylene	(40 ppm)**	100 ppm 150 ppm = STEL	
	MEK (methyl ethyl ketone)	(25 ppm)**	200 ppm	
	methanol	(20 ppm)**	200 ppm	

Department	Contaminants	Exposure Level (8 hrs TWA)*	PEL	Controls
Coating: Spray booth gun cleaning	toluene	80 ppm (30 min)	200 ppm 500 ppm = 10 min peak	Half-facepiece APR with organic vapor cartridge
	methanol	300 (30 min)	200 ppm	
Coating: Dip Coat	toluene	25 ppm	200 ppm 500 ppm = 10 min peak	Automated line is vented. Workers may voluntarily wear half-facepiece APR with organic vapor cartridge.
	xylene	50 ppm	100 ppm 150 ppm = STEL	
	MEK	60 ppm	200 ppm	
	MIBK	10 ppm	100 ppm	
	methanol	50 ppm	200 ppm	
Drying (oven)	None (monitoring revealed no significant exposures)	NA	NA	NA

Department	Contaminants	Exposure Level (8 hrs TWA)*	PEL	Controls
Assembly: Sanding, gluing and nailing	wood dust	2.5 -6.0 mg/m ³	5 mg/m ³ (TLV= 1 mg/m ³)	aqueous-based glues will be used to eliminate exposures to methylene chloride, formaldehyde and epichlorohydrin
	formaldehyde	1.0 ppm	0.75 ppm 2 ppm = STEL	
	epichlorohydrin	4 ppm	5 ppm	
	methylene chloride	60 ppm	25 ppm 125 ppm = STEL	
Maintenance: Dip tank cleaning	toluene, xylene, MEK, MIBK, methanol	IDLH conditions		SAR, pressure demand with auxiliary SCBA must be worn
Maintenance: Spray booth cleaning/filter change	particulates	1.8 mg/m ³	5 mg/m ³	Voluntary use, half- facepiece APR with P100 filter

Department	Contaminants	Exposure Level (8 hrs TWA)*	PEL	Controls
Maintenance: Loading coatings into supply systems	toluene	40 ppm (1 hr)	200 ppm 500 ppm = 10 min peak	Voluntary use, half- facepiece APR with organic vapor cartridges
	xylene	80 ppm (1 hr)	100 ppm 150 ppm = STEL	
	MEK	100 ppm (1 hr)	200 ppm	
	MIBK	15 ppm (1 hr)	100 ppm	
	methanol	125 ppm (1 hr)	200 ppm	
Warehouse	None	NA	NA	NA

* Summarized from Industrial Hygiene report provided by ABC Industrial Hygiene Services

** These values were obtained from a survey on average exposures in downdraft spray booths utilized in the furniture coating industry as published in the American Journal of Industrial Hygiene _____.

APPENDIX V
References

REFERENCES

Questions and Answers on the Respiratory Protection Standard OSHA Publication

Available from: OSHA, See the list of area and regional offices in Appendix II; Web site: www.OSHA.gov.

OSHA Instruction: Inspection Procedures for the Respiratory Protection Standard OSHA Publication. Available from OSHA web site: www.OSHA.gov.

Respirator Selection Guide OSHA Publication

Available from: OSHA, See the list of area and regional offices in Appendix II; Web site: www.OSHA.gov.

Documentation of the Threshold Limit Values

Available from: ACGIH Publications Office, 6500 Glenway Ave., Building D-5, Cincinnati, OH 45221

NIOSH/OSHA Pocket Guide to Chemical Hazards

Available from: National Institute for Occupational Safety and Health

Phone Number: (800-356-4674); Web site: www.cdc.gov/niosh/homepage.html

ANSI Respirator Standard 1992 Z88.2

Condensed Chemical Dictionary

Gessner G. Hawley, Van Nostrand Reinhold Co., 135 W. 50th St., New York, NY 10020

Industrial Respiratory Protection NIOSH Publication

Available from: National Institute for Occupational Safety and Health

Phone Number: (800-356-4674); Web site: www.cdc.gov/niosh/homepage.html

Respirator Decision Logic NIOSH Publication

Available from: National Institute for Occupational Safety and Health

Phone Number: (800-356-4674); Web site: www.cdc.gov/niosh/homepage.html

NIOSH Guide to the Selection and Use of Particulate Respirators Certified Under 42 CFR 84

Available from: National Institute for Occupational Safety and Health

Phone Number: (800-356-4674); Web site: www.cdc.gov/niosh/homepage.html

OSHAOccupational Safety & Health Administration
U.S. Department of Labor**OSHA Directives****CPL 2-0.120 - Inspection procedures for the Respiratory Protection Standard.**[OSHA Directives - Table of Contents](#)

- **Record Type:** Instruction
- **Directive Number:** CPL 2-0.120
- **Subject:** Inspection procedures for the Respiratory Protection Standard.
- **Information Date:** 09/25/1998



OSHA INSTRUCTION

U.S. DEPARTMENT OF LABOR

Occupational Safety and Health Administration

DIRECTIVE NUMBER: CPL 2-0.120 **EFFECTIVE DATE:** September 25, 1998**SUBJECT:** Inspection Procedures for the Respiratory Protection Standard**ABSTRACT**

Purpose: This instruction establishes agency interpretations and enforcement policies, and provides instructions to ensure uniform enforcement of the Respiratory Protection Standard, 29 CFR 1910.134

Scope: This instruction applies OSHA-wide

References: OSHA Instruction, CPL 2.103, Field Inspection Reference Manual.
OSHA Instruction CPL 2.111, Citation Policy for Paperwork and Written Program Violations
29 CFR 1910.134, Respiratory Protection Standard.
NIOSH Respirator Certification Requirements 42 CFR 84 and 30 CFR 11.

Cancellations: None

State Impact: See Paragraph V.

Action Offices: National, Regional and Area Offices

Originating Office: Directorate of Compliance Programs

Contact: Office of Health Compliance Assistance (202) 219-8036
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By and Under the Authority of
Charles Jeffress
Assistant Secretary

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- I. Purpose. This instruction establishes agency interpretations and enforcement policies, and provides instructions to ensure uniform enforcement of the Respiratory Protection Standard, 29 CFR 1910.134.
 - II. Scope. This instruction applies OSHA-wide.

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- A. OSHA Instruction, CPL 2.103, Field Inspection Reference Manual, September 26, 1994.
- B. OSHA Instruction CPL 2.100, Inspection Procedures for the Permit Required Confined Space Standard, May 5, 1995.
- C. OSHA Instruction CPL 2.111, Citation Policy for Paperwork and Written Program Violations, November 27, 1995.
- D. OSHA Instruction, CPL 2-2.30, Authorization of Review of Medical Opinions, November 14, 1980.
- E. OSHA Instruction, CPL 2-2.32, Authorization of Review of Specific Medical Information, January 19, 1981.
- F. OSHA Instruction, CPL 2-2.33, Rules of Agency Practice and Procedure Concerning OSHA Access to Employee Medical Records-Procedures Governing Enforcement Activities, February 8, 1982.
- G. OSHA Instruction, CPL 2-2.46, Authorization and Procedures for Reviewing Medical Records, January 5, 1989.
- H. OSHA Instruction CPL 2-2.59A, Inspection Procedures for the Hazardous Waste Operations and Emergency Response Standard, April 24, 1998.
- I. OSHA Instruction, PER 8-2.4, CSHO Pre-Employment Medical Examinations, March 31, 1989.
- J. OSHA Instruction, PER 8-2.5, CSHO Medical Examinations, March 31, 1989.
- K. 29 CFR 1910.134, Respiratory Protection Standard.
- L. NIOSH Respirator Certification Requirements 42 CFR 84 and 30 CFR 11.
- M. 1992 American National Standards Institute (ANSI) Z88.2 Respirator Standard.

IV. **Action.** OSHA Regional Administrators and Area Directors shall use the guidelines in this instruction to ensure uniform enforcement of the Respiratory Protection Standard, 29 CFR 1910.134.

V. **Federal Program Change.** This instruction describes a Federal Program Change for which State adoption is not required. NOTE: In order to effectively enforce safety and health standards, guidance to compliance staff is necessary. Therefore, although adoption of this instruction is not required, States are expected to have standards, enforcement policies and procedures which are at least as effective as those of Federal OSHA.

VI. **Background.** In 1971, OSHA adopted the ANSI standard Z88.2-1969, "Practices for Respiratory Protection," as well as ANSI Standard K13.1-1969, "Identification of Gas Mask Canisters" as its standard for respiratory protection. In April of 1971, OSHA promulgated 29 CFR 1926.103, the initial respiratory protection standard for the construction industry. On February 9, 1979, OSHA announced that 29 CFR 1910.134 would be formally recognized as also being applicable to the construction industry (44 FR 8577).

On November 15, 1994, OSHA issued a Notice of Proposed Rulemaking to revise 29 CFR 1910.134. Public hearings were held in 1995, and the Final Rule was published in the Federal Register on January 8, 1998. The new standard updates the previous standard and incorporates new technology and current scientific knowledge regarding respiratory protection. Application of the requirements of the new standard in affected workplaces will promote more effective use of respirators and provide greater

compliance flexibility. Language in the new standard has been developed to make some requirements in the previous standard more understandable. On April 23, 1998, corrections to the regulatory text were published in the Federal Register.

The new respiratory protection standard also makes the respiratory protection provisions of other health standards consistent with each other and with the final rule. This will make these provisions easier to administer.

The prior Respirator Standard, 1910.134, remains in effect until October 5, 1998, the date when employers must be in compliance with the new standard. On October 5, the prior 1910.134 will be retained, but re-designated as 1910.139. It will apply only to respiratory protection against **M. tuberculosis** (TB) until OSHA has promulgated the final standard for Occupational Exposure to Tuberculosis.

VII. Inspection Guidelines for the Standard on Respiratory Protection, 29 CFR

1910.134. These guidelines relate to specific provisions of **29 CFR 1910.134** and are provided to assist compliance officers with conducting inspections where the standard may apply. Any subparagraphs of the standard not discussed in this Directive, should be enforced according to their terms.

A. Scope and Application

1. This new standard applies to all respirator usage in General Industry, Shipyards, Marine Terminals, Longshoring and Construction workplaces. It does not apply to agricultural operations or to occupational exposure to **M. tuberculosis**. Respiratory protection against tuberculosis will continue to be enforced under the old 1910.134, which has been redesignated 1910.139.
2. The standard covers respirator use where respirators are being worn to protect employees from exposure to air contaminants above an exposure limit or are otherwise necessary to protect employee health, where respirators are otherwise required to be worn by the employer, and where respirators are voluntarily worn by employees for comfort or other reasons.

B. Permissible Practice - 1910.134(a)(1) and (a)(2): Section 134 (a)(1) restates OSHA's longstanding policy that engineering and work practice controls should be the primary means used to reduce employee exposure to toxic chemicals, and that respirators should only be used if engineering or work practice controls are infeasible or while they are being implemented. This preference for engineering and work practice controls is stated in a number of OSHA's substance specific standards (for example, the asbestos standard) and in the standards (29 CFR 1910.1000 and, for construction work, 29 CFR 1926.55) establishing permissible exposure limits for a number of harmful air contaminants. Feasible engineering, administrative or work practice controls must be instituted even though they may not be sufficient to reduce exposure to or below the permissible exposure limit (PEL). They must be used in conjunction with respirators whenever exposures exceed permitted levels.

1. Inspection Guidelines. The compliance officer should determine what engineering controls are in place and what work practices have been instituted to effectively reduce exposure. If controls are in place, but

sampling results indicate these controls have not reduced air contaminant levels to the extent necessary to protect the health of the employee, then the CSHO should determine if the appropriate respirators are being provided and properly used. Even if the employer has not instituted the required engineering controls, failure to provide respirators to protect employees health is citable under 1910.134.

2. Citation Guidelines: In cases where an overexposure to an OSHA Permissible Exposure Limit (PEL), (either an 8-hour time-weighted-average, Ceiling Value, Short Term Exposure Limit or Acceptable Maximum Peak) is exceeded, the following principles apply:

- a. Violations for Exceeding an Exposure Limit. Where a PEL is exceeded for a substance listed in Table Z of 1910.1000 or Appendix A of 1926.55, the appropriate paragraph 1910.1000(a) thru (d), or 1926.55(a), should be cited. For substance-specific standards, the appropriate paragraph for exceeding the PEL should be cited.

Exposures to levels of air contaminants which exceed ACGIH Threshold Limit Values (TLVs) or NIOSH recommended exposure limits (RELs), but which have no OSHA PEL, and which are considered to be serious exposure hazards, should be considered for violations of Section 5(a)(1) of the Act. Guidelines on citing Section 5(a)(1) can be found in the Field Inspection Reference Manual (CPL 2.103 Chapter III).

Section 5(a)(1) shall not normally be used to impose a stricter requirement than that required by the standard. For example, if the standard provides for a permissible exposure limit (PEL) of 5 ppm, even if data establishes that a 3 ppm level is a recognized hazard, Section 5(a)(1) shall not be cited to require that the 3 ppm level be achieved unless the limits are based on different health effects. If the standard has only a time-weighted average permissible exposure level and the hazard involves exposure above a recognized ceiling level, the Area Director shall consult with the Regional Solicitor.

NOTE: An exception to this rule may apply if it can be documented that "an employer knows a particular safety or health standard is inadequate to protect his workers against the specific hazard it is intended to address." Such cases shall be subject to pre-citation review.

Section 5(a)(1) violations of the Act should be cited so as to cover all aspects of a serious hazard for which no standard exists. Related violations of the respirator or other standards should be grouped with any Section 5(a)(1) violations.

- b. Engineering and Administrative Controls. An employer's failure to implement feasible engineering or work practice controls should be cited under an applicable provision of a substance-specific standard (for example, section 1910.1000(f) of the general industry

asbestos standard) or, for those substances listed in 1910.1000 or 1926.55, under 1910.1000(e) or 1926.55(b). The requirement to implement feasible engineering and administrative controls is in several substance-specific standards (for example, section 1910.1001(f) of the asbestos standard). These violations should normally be grouped with the overexposure. Section 1910.134 (a)(1) should not be cited along with 1910.1000(e) or 1926.55(b). Section 1910.134(a)(1) should not be cited when an employer fails to use engineering or work practice controls to reduce exposures to chemicals for which OSHA has not established permissible exposure limits. In appropriate circumstances, an employer's failure to use feasible engineering or work practice controls when there is no OSHA PEL may be citable under 5(a)(1) of the Act.

- c. **The Requirement to Provide Respirators.** Whether or not an employer has instituted required engineering or work practice controls, the employer's failure to provide respirators when employees are exposed to hazardous levels of air contaminants is citable under 1910.134. The requirement to provide respirators is found in several substance-specific standards (for example, 1910.1025(e) and (f) of the general industry lead standard). In cases involving those standards, where respirators have not been provided, the section of the substance-specific standard requiring respirators should be cited. If the substance is listed only in Table Z, the violation for not providing a respirator should be cited 1910.134(a)(2). These violations also would normally be grouped with the overexposure.

The employer must provide the right type of respirator for the substance and level of exposure involved. If the employer provided the wrong kind of respirator, a citation should be issued under paragraph (d) for not providing an **appropriate** respirator, unless a substance specific standard is applicable.

- d. **The Requirement to Ensure the Use of Respirators.** Where respirators are needed to protect the health of the employees, employers must not only provide respirators but ensure that employees use them. In cases involving substance-specific standards, the section of the standard requiring respirator use should be cited when employers have not ensured respirator use. If the substance is only listed in Table Z (1910.1000) or Appendix A (1926.55), citations for not ensuring respirator use should be cited under 1910.1000(e) or 1926.55(b). For substances not listed in 1910.1000, 1926.55, or substance-specific standards, 1910.134(a)(1) should be cited when the employer fails to ensure respirator use.
- e. **The Requirement to Have a Program.** Paragraph (a)(2) requires the employer to establish and maintain a respiratory protection program that includes the requirements in 1910.134(c) whenever respirators are required to protect the health of the employee. The program must be in writing and contain all of the elements specified in 1910.134(c). If the employer has no program at all (i.e., no

elements of a respirator program in place), a citation for violation of .134 (a)(2) should be issued. If respirators are used or other respirator violations are found, and there is no written program, then those violations and .134(c)(1) should be cited. If an employer has a written program, but an element required by .134(c) is omitted, then the subsection of .134(c) that requires the missing element should be cited.

The specific actions that the employer must take are in 1910.134(d)-(m). If the employer's written program has all of the required elements, but the employer has not taken one of the actions required in .134(d)-(m), cite the applicable paragraph in .134(d)-(m). If no written program exists, but all other provisions of the standard have been met, a violation for lack of a written program would normally not be cited. CPL 2.111, Citation Policy for Paperwork and Written Programs, should be reviewed for guidance before citing the written program.

C. **Definitions-1910.134(b):** The revised standard now contains definitions in paragraph (b) that provide a clearer understanding of specific terminology used in the standard and how these terms are applied to respirators and their use. Some definitions in the proposal were not included in the final standard, and some new definitions were added.

1. **"Adequate warning properties"** was not included in the final standard because the two major warning properties, odor and irritation, are unreliable or otherwise inappropriate to be used as primary indicators of sorbent exhaustion.
2. **"Assigned Protection Factor"** has not yet been included in the standard. OSHA is conducting further rulemaking on this issue, and will eventually add the APFs to the final standard. In the interim, OSHA will continue to refer to NIOSH APFs except in cases where APFs have been published in substance-specific standards or are addressed by OSHA in separate letters of interpretation. Employers must rely on the best available information when selecting the appropriate respirator.
3. **"Filtering facepiece"** (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium. Whenever a filtering facepiece is used to meet the requirements of the standard, it must be NIOSH approved.
4. A **"HEPA filter"** (High Efficiency Particulate Air) is a filter that is 99.97% efficient in removing monodispersed particles of 0.3 micrometers in diameter. NIOSH no longer uses this term in its new respirator certification standard (42 CFR 84). However, OSHA has retained this definition because it is used in many of the existing substance-specific standards. When HEPA filters are required by an OSHA standard, N100, R100, and P100 filters can be used to replace them.

(Part 11) were replaced by 42 CFR 84 (Part 84) on July 10, 1995. Only certifications of non-powered, air-purifying, particulate-filter respirators were affected by this change. The remaining portions of Part 11 were incorporated into Part 84 without change. Part 84 permitted the manufacture and sale of non-powered-particulate respirators certified under Part 11 until July 10, 1998.

Distributors who have purchased these respirators will be able to sell them until their inventories are depleted. Employers may continue to purchase available products and will be permitted to use them until their inventories are depleted, or until the shelf or service life for the product expires. However, Dust/Mist and Dust/Mist/Fume Filters may only be used for particulates with mass median aerodynamic diameters (MMAD) of least 2 micrometers, in accordance with paragraph (d)(3)(iv)(C). Welding fumes and silica flour may be examples of dust particulates that are less than 2 micrometers. If the MMAD cannot be determined, a HEPA filter, or a filter certified by NIOSH under 42 CFR 84 (N95 or higher) must be selected.

D. Respiratory Protection Program-1910.134(c)(1): A written respiratory protection program is required when necessary to protect the health of the employee from workplace contaminants or when the employer requires the use of respirators. A limited written program is also required when respirators (other than filtering facepieces) are being voluntarily worn by employees. The program must include workplace specific procedures and contain all applicable program elements. Where respirators are required, respirators (and their associated requirements such as fit-testing and maintenance), training and medical evaluations must be provided at no cost to the employee. It is the intent of the standard that the employer would not be required to incur any costs associated with voluntary use of filtering facepieces other than providing a copy of Appendix D to each user. If employers allow the voluntary use of respirators other than filtering facepieces, the costs associated with ensuring the respirator itself does not create a hazard, such as medical evaluations and maintenance must be provided at no cost to the employee.

1. **Inspection Guidelines.** During inspections of workplaces where respirators are used, the CSHO is to evaluate the respiratory program and determine if the employer's written program is adequate and complete for that particular site.

The program must be tailored to cover the specific work operations and practices in the workplace. The provisions listed in paragraph (c)(1)(i) thru (ix) of the standard must be included in the written program unless it is determined they are not applicable.

These provisions are to be considered when evaluating a written program:

- a. (i) procedures for selecting respirators
- b. (ii) medical evaluations for users,
- c. (iii) fit-testing procedures for tight-fitting respirators,
- d. (iv) procedures for proper use during routine and emergency

situations,

- e. (v) procedures for cleaning, storing, disinfecting, etc.,
- f. (vi) procedures to ensure adequate air quality and flow for atmosphere-supplying respirators
- g. (vii) training on respiratory hazards,
- h. (viii) training on proper use, donning and removing the respirator etc.,
- i. (ix) procedures for regularly evaluating the effectiveness of the program.

Compliance with the program should be verified during the walkaround by personal observation and employee interviews.

2. Citation Guidelines. If respirators are required to be worn in the workplace or respirators other than dust masks are worn by voluntary users, a written program is required. An overexposure is not required to cite this paragraph. If the CSHO determines that specific provisions are lacking or deficient in the written program, the CSHO should cite section (c)(1) with the specific element(s) that are missing. Discrepancies between the written program and implemented work practices at the worksite should be cited by the appropriate paragraph in the standard that requires the work practice. If overexposures are found and no program at all exists, paragraph (a)(2) should be cited.
3. (c)(2) Voluntary Use: Normally, respirators that are voluntarily used by employees will be filtering facepieces (dust masks). NIOSH-approved respirators are strongly recommended, but they are not required for voluntary use. This voluntary use of dust masks alone does not require the employer to have a written program. For filtering facepiece respirator use, the employer needs only ensure that dust masks are not dirty or contaminated, that their use does not interfere with the employee's ability to work safely, and that a copy of Appendix D is provided to each voluntary wearer. Merely posting Appendix D is not considered adequate.

Use of elastomeric or supplied-air respirators, even when voluntary on the part of the employee, will require the employer to include all elements in a written program that will ensure use of these respirators does not create a hazard.

4. Inspection Guidelines Even though employees may be voluntarily using respirators, adverse health conditions can be caused by the wearing of a respirator itself. Examples include, but are not limited to:
 - a. (1) an employee's health being jeopardized by the wearing of a respirator (e.g., employee has a cardiac and/or pulmonary disorder that could be aggravated by respirator use),
 - b. (2) the wearing of a dirty respirator that can cause dermatitis or ingestion of a hazardous chemical;
 - c. (3) the sharing of a respirator that leads to transmittal of disease.

5. Citation Guidelines Maintenance (h) and medical evaluation (e) violations should be considered for all situations where employees have elected to use a respirator, other than a dust mask, for personal comfort. If overexposures are found, then all other applicable subparagraphs should be cited.

6. (c)(3) Program Administrator: A "respiratory protection program administrator" is required to oversee and evaluate the respirator program. This individual must be suitably trained and have the appropriate accountability and responsibility to manage the full respiratory protection program.

Companies with multiple worksites may have a program administrator at each worksite, as long as this person is qualified and retains the accountability and responsibility for the day-to-day operation of the specific program for that site. Alternatively, a company may opt to have one program administrator for several sites and/or one program for several similar sites as long as the program contains the necessary elements and addresses the hazards at those sites.

7. Inspection Guidelines. The extent of training or experience required for the program administrator will vary based on the complexity of the respiratory hazards in the workplace. Where significant program deficiencies are discovered, compliance officers should discuss questions about the program with the program administrator to determine how familiar she or he is with respirators, the hazards in the workplace, respirator use in the facility, the respirator standard and the company's respirator program.

E. Selection of Respirators and Hazard Evaluation-1910.134(d): The employer is required to select and provide an appropriate respirator (NIOSH certified) based on the respiratory hazard(s) present in the workplace. The employer must identify hazardous airborne contaminants that employees may inhale and make a reasonable estimate of employee exposures in determining the appropriate respirator for employees to use. Oxygen deficient atmospheres and those atmospheres that are not or cannot be estimated must be treated as IDLH environments. Where a contaminant is regulated by a substance-specific standard that requires monitoring, failure to monitor in accordance with the standard's terms would be cited under that standard. For other contaminants, although the most reliable and accurate method to determine exposure is to conduct personal air monitoring, it is not explicitly required by the respirator standard. Instead, other means can be used to estimate workplace exposures. Acceptable means include:

- Use of objective data - this is the use of data obtained from industry studies, trade associations, or from tests conducted by chemical manufacturers which demonstrate that air contaminants cannot be released in the workplace in airborne concentrations that are IDLH. The objective data shall represent the highest contaminant exposures likely to occur under reasonably foreseeable conditions of processing, use, or handling. The employer must document the use of objective data as part of their written program.

- Application of mathematical approaches - the preamble to the final rule (p. 1199) states that employers can use data on the physical and chemical properties of air contaminants, combined with information on room dimensions, air exchange rates, contaminant release rates, and other pertinent data including exposure patterns and work practices to estimate the maximum exposure that could be anticipated in the workplace.
 - As a continuing practice, employers are required to identify hazards as a result of changes in the workplace such as a change in equipment, process, products, or control measures that could result in new exposures. Appropriate respirators should be provided as necessary.
1. Inspection Guidelines. The CSHO should closely scrutinize the employer's estimate of employee exposure and determine if the hazard assessment is based on appropriate data and reliable information. OSHA personnel have considerable experience evaluating air monitoring data for representativeness of the sample and reliability and accuracy of data. Where objective data are used in the workplace to determine employee exposure, the data must have been obtained under conditions which closely resemble the process, types of materials, control methods, work practices, and environmental conditions.

In regards to mathematical predictive equations, their use should be limited to situations where workplace factors, such as contaminant release and ventilation system performance, are fairly constant over the work shift and predictable. The results should incorporate reasonable safety factors and be interpreted conservatively. CSHO's must exercise a great deal of professional judgement in concluding if the mathematical approach provides appropriate guidance. (e.g., The methylene chloride standard forbids the use of APR's for protection against methylene chloride and would supercede any model which predicts a changeout time for this chemical.)

The CSHO should examine the employer's Hazard Communication Program for further information on existing respiratory hazards in the workplace.

The Hazard Communication Standard requires employers to inventory the hazardous chemicals in their workplace and to maintain copies of material safety data sheets (MSDS) for each hazardous chemical. In a similar manner under the respirator standard, the employer must examine the workplace and determine if the quantity, circumstances, and use of the hazardous chemicals require further evaluation for respiratory hazards. MSDSs contain information such as physical and chemical characteristics and hazards, primary route(s) of entry, and generally applicable control measures. Some MSDSs include some recommendations on appropriate respiratory protection.

For those chemicals that do present a potential respiratory hazard, employers can contact the chemical manufacturer for additional information on predicted exposure levels and methods to further control worker exposure.

The CSHO should be aware of the potential for an emergency situation and the type of respirators selected. The employer must provide the appropriate emergency escape respirator in the immediate work area for employee use and address emergency use respirators in the written respirator program.

The CSHO should also investigate, through routine employee interviews, what actions the employer has taken to re-evaluate employee exposure when employees have made health complaints to determine if appropriate action has been taken to address a respiratory hazard.

Respirators required to be used in the workplace must be NIOSH-approved and appropriate for the hazard. Part 84 respirators with an "N" designation should not be used in work settings where oil aerosols are generated, while those with an "R" designation should be used for only one shift when oil is present. Respirators with a "P" designation may be used for more than one work shift, even when oil is present. Employers must follow respirator manufacturer's recommendations.

2. Citation Guidelines. If the employer has not made any effort to assess the respiratory hazards, and there is potential for an overexposure, the CSHO should cite section (d)(1)(iii). The extent to which the employer explored ways to reasonably estimate exposures must be evaluated at each worksite.

Inappropriate respirators [(d)(1)(i)] should be cited when the CSHO documents an overexposure is possible, and a suitable respirator is not being used for protection against that exposure. Unapproved [(d)(1)(ii)] respirators can be cited even where an overexposure has not been established.

3. (d)(3)(iii)(B) Air-purifying Respirators for Protection Against Gases and Vapors on Atmospheres That Are Not IDLH - If a cartridge/canister air purifying respirator for the protection against gases and vapors does not have an ESLI, then the employer must implement a cartridge/canister change schedule based on objective information that will ensure the cartridges/canisters are changed before the end of their service life. The purpose of a change schedule is to establish the time period for replacing respirator cartridges and canisters; this is critical to preventing contaminants from respirator breakthrough, and thereby over-exposing workers. Data and information relied upon to establish the schedule must be included in the respirator program. The requirements for several of OSHA's chemical specific standards already address this issue and have been retained. These include:

- | | |
|--|---|
| a. Acrylonitrile 1910.1045(h)(2)(ii) | end-of-service life or end of shift (whichever occurs first) |
| b. Benzene 1910.1028(g)(2)(ii) | end-of-service life or beginning of shift (whichever occurs first) |
| c. Butadiene 1910.1051 (h)(2)(ii) | every 1, 2 or 4 hours dependent on concentration according to Table 1 and at beginning of each shift |
| d. Formaldehyde 1910.1048 (g)(2)(ii) - | for cartridges every three hours or end of shift (whichever is sooner); for canisters, every 2 or 4 hours according to the schedule in (g)(3)(iv) |
| e. Vinyl chloride 1910.1017(g)(3)(ii) | end-of-service life or end of shift in which they are first used (whichever occurs first) |
| f. Methylene chloride - 1910.1052 (g)(2)(ii) | canisters may only be used for emergency escape and must be replaced after use. |

Change schedules for all other gases and vapors must be established and implemented by the employer. OSHA has stated in the preamble to the final rule that the employer is not required to research and analyze experimental breakthrough data, but may obtain information from sources who have expertise and knowledge that can help the employer to develop reasonable change schedules. The new standard prohibits the use of warning properties as the sole basis for determining change schedules. However respirator users should be trained to understand that abnormal odor or irritation is evidence that respirator cartridges need to be replaced. Where an effective change schedule is implemented, air-purifying gas and vapor respirators may be used for hazardous chemicals, including those with few or no warning properties.

4. Inspection Guidelines - OSHA understands that new or existing objective data could be presented in a variety of formats and from a number of different sources. CSHOs should approach the evaluation of this requirement with professional judgement and flexibility. There are a number of factors that influence the service life of a cartridge. Some of the more significant factors include: the contaminant's chemical properties, temperature, humidity, contaminant concentration, work rate (breathing rate) of the respirator user, variability of respirator cartridges between manufacturers, and the presence of multiple contaminants. To ensure fair and reasonable enforcement of this provision, the following guidelines are presented to assist the CSHO in determining compliance with this

provision.

- a. **Availability of Objective Data:** Ascertain if there are sources of objective data for the particular make and model of the respirator cartridge/canister and if this data is sufficient to implement change schedules. Typical sources would include: respirator manufacturers, industry organizations, trade associations, professional societies, chemical manufacturers (MSDS), academic institutions, and ad hoc committees. The CSHO should determine if the employer has access to adequate information to comply with this provision. For a list of some options that employers may use in developing their change schedules, refer to Appendix A.
- b. **Use of Inappropriate Respirator Cartridge/canister:** Determine if the air purifying respirator is appropriate for the contaminant present in the workplace. In some cases, the breakthrough time may be so rapid (minutes) that air purifying respirators are not feasible and supplied air respirators should be used. CSHOs should consult respirator manufacturers and other reference material for this information.
- c. **Change Schedules For Mixtures:** Establishing cartridge service life for mixtures of contaminants is a complex task and one that requires considerable professional judgement to create a reasonable change schedule. Cartridge service life for mixtures is best determined using experimental methods. Change schedules are very difficult to develop for mixtures using predictive mathematical models.

The change schedule for a mixture should be based on reasonable assumptions that include a margin of safety for the worker wearing the respirator. Where the individual compounds in the mixture have similar breakthrough times (i.e. within one order of magnitude), service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component or compound with the shortest breakthrough time (i.e., sum up the concentration of the components). Where the individual compounds in the mixture vary by 2 orders of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time. OSHA believes that an approach such as this reflects good health and safety practice where neither objective or experimental data is available for the mixture.

OSHA believes that change schedule information will become more available to the respirator user community and will evolve in quality. The CSHO should review the written respiratory protection program to ensure that it describes the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data as required by the standard. Again, CSHOs should exercise judgement in evaluating mathematical models, rules of thumb, experimental data, use of analogous chemical structures, and other reasoned approaches.

- d. **Chemical Contaminant Migration:** CSHO's should be aware that some contaminants have a tendency to migrate through cartridge/canister sorbent material during periods of storage or non-use. This is characteristic of the contaminant-carbon bed interaction for organic chemicals with boiling points below 65 Centigrade and would predictably shorten breakthrough times. In cases where respirators are used for multiple days this could present an additional exposure to the respirator user. Where contaminant migration is possible, respirator cartridges/canisters should be changed after every workshift where exposure occurs unless the employer has specific objective data to the contrary (desorption studies) showing the performance of the cartridge in the conditions and schedule of use/non-use found in the workplace.

5. **Citation Guidelines.** If the employer has or could have had the knowledge available to implement change schedules and had done little or nothing to determine accurate change schedules, (d)(3)(iii)(B) should be cited. For citation purposes, the CSHO should document the purpose of respirator use, make and model of respirator(s), identification and concentration of contaminant (s), duration of use, exposure to a mixture of contaminants and any other relevant user and workplace factors.

F. **Medical Evaluation - 1910.134(e):** Employers must provide a medical evaluation to determine each employee's fitness to wear a respirator. The evaluation must be provided before the initial fit-testing and before the respirator is used for the first time. Medical evaluations consist of the administration of a medical questionnaire, which is found in the mandatory Appendix C of the standard, or provision of a physical examination that elicits the same information as the questionnaire for the employee. An employer, who opts to provide physical examinations to his or her employees, need not also administer the medical questionnaire. These evaluations are required for **all** respirator users except for employees who voluntarily use dust masks and for those whose only respirator would be the use of escape-only respirators. SCBA's are not considered escape-only respirators. Employees who refuse to be medically evaluated cannot be assigned to work in areas where they are required to wear a respirator.

Where employers use a transient workforce, (e.g., temporary or construction workers), the employer may accept the written medical recommendation of the employee's ability to use a respirator as determined by their previous employer's PLCHP only if the work conditions and type and weight of the respirator remains the same and appropriate for use at their new work site. In this situation, the employer must obtain from the previous employer a copy of the PLCHP's written recommendation.

Section (e)(2)(ii) requires the employer to obtain the information required in the questionnaire or provide the initial examination prior to performing fit testing of employees and prior to requiring the employee to wear the respirator in the workplace. When using the questionnaire, the employer may not change the wording of questions in Part A, if the form is being used as the sole means to evaluate employees. The Physician or other Licensed Health Care Professional (PLHCP) may add questions to the questionnaire that could assist in determining

whether the employee can perform the work while wearing respiratory protection.

In order to maintain strict confidentiality of the information obtained in the questionnaire, the employer's role is limited to distributing the blank questionnaire to the employee for him or her to fill out, or providing it to the PLHCP, who will administer the questionnaire to the employee. If the employer provides the questionnaire to the employee, an addressed and postage-paid envelope should also be provided for the employee to mail it to the PLHCP. The questionnaire and findings may also be maintained by the employer's medical office, if the health office is administratively separate from the employer's central administration offices.

If the employer does not have or chooses not to use an in-house medical staff, arrangements must be made for a physician or other licensed healthcare professional (PLHCP) to perform the medical evaluations. The PLHCP may be a physician, a registered nurse, a nurse practitioner, a physician assistant, or other licensed health care professional acting within the scope of his or her state license, registration, or certification. The PLHCP must be legally permitted by his or her professional license to conduct the type of medical evaluation required by the respirator standard. Scope of practice for non-physician PLCHPs will vary from state to state. All PLCHPs who participate in any aspect of the medical evaluation must be practicing within the scope of their license. For assistance in determining which state licensing board or agency to contact to determine a PLHCP's legally permitted scope of practice, the CSHO can contact the Directorate of Technical Support in OSHA's National Office.

The employer must ensure that the questionnaire is administered in such a manner that employees can understand the content and the confidentiality of the record is maintained. Where the employee cannot understand English, the employer must have the questionnaire translated into the employee's language either through a translator or a translated written copy. The questionnaire has been translated into Spanish and is available on OSHA's homepage (www.osha.gov) in the Respirator Q & A Document. In cases where the employee cannot read, the employee can request someone other than the employer to orally read them the questionnaire or the PLHCP may obtain through an interview or examination the same information requested on the medical questionnaire.

1. Inspection Guidelines. The CSHO should determine if the requirements of paragraph (e) are being met by interviewing a number of employees and asking if they have been provided with a confidential evaluation of their ability to wear a respirator, either by the administration of the medical questionnaire or by physical examination. Compliance officers should determine what mechanism the employer is using to ensure that the employer does not see the answers to the questionnaire in order to maintain confidentiality. The CSHO can verify that these medical evaluations have in fact been conducted by asking the employer to see the written recommendation of the employee's ability to use a respirator. The employee should have also received a copy. The recommendation must contain only the information required by subparagraph (e)(6).

The CSHO should determine what supplemental information was given to the PLHCP by the employer. This can be done through interviewing the PLHCP or reviewing documentation from the employer. If the employer is relying on a medical evaluation for the employee from a previous employer (which is allowed only when the employer uses a transient workforce), the CSHO should determine that the work conditions and respirator remained the same.

If the CSHO suspects the employee(s) did not receive a medical evaluation or have not answered the questionnaire honestly (e.g., been "coached" by the employer on how to respond to the mandatory questions from Appendix C), then the CSHO should ask to interview the PLHCP. If this interview still results in questions, the CSHO may wish to obtain a Medical Access Order and review the actual medical questionnaire and/or the physical examination records where necessitated by this paragraph of the rule.

The CSHO should also ensure that any required physical examinations have in fact been conducted, as per (e)(3) and (e)(7). A positive answer to any question in Part A, Section 2, Questions 1-8 (also questions 10-15 for SCBA and full-face respirator users) requires a follow-up by the PLHCP. The PLHCP may evaluate positive responses through consultation with the employee to determine if the positive response is not relevant to the employee's ability to wear a respirator or if further physical examination is necessary (e.g., brief smoking history in the past, as compared to current heavy smoker status).

If questions arise regarding the issue of qualifications of the PLHCP, the CSHO should inquire with the state licensing board or the applicable registration or certification agencies in that state to ensure that the PLHCP is acting within the scope of his or her practice.

2. Citation Guidelines: If medical evaluations are not provided, a violation of (e)(1) exists. If the PLHCP designated by the employer is not operating within the scope of their license or their license has expired or is invalid, the employer should be cited under paragraph (e)(2)(i) for choosing an inappropriate PLHCP.

- a. If the employer's medical evaluation does not obtain the mandatory information required in Part A, Sections 1 and 2 of Appendix C, then a violation of (e)(2)(ii) exists.
- b. If the PLHCP is not provided with the appropriate supplemental information, a violation of (e)(5) exists.

- G. **Fit Testing-1910.134(f):** Fit testing is required for all employees using negative or positive pressure tight-fitting respirators, where such respirators are required by OSHA or where the employer requires the use of such a respirator. A fit test is not required for voluntary users or for escape-only respirators.

The fit test must be performed before the respirator is used in the workplace. It must be repeated at least annually and whenever a different respirator facepiece

is used or a change in the employee's physical condition could affect respirator fit. If the respirator subsequently becomes unacceptable (i.e., causes irritation or pain to the employee) to the employee, the employee must be given the opportunity to select a different respirator facepiece and be retested.

Qualitative Fit-Testing (QLFT) may be used to fit test negative pressure air-purifying respirators, if they will only be used in atmospheres less than ten times the PEL, since existing evidence only validates the QLFT protocols listed in Appendix A to identify respirators that achieve a fit factor of 100. For greater concentrations, Quantitative Fit-Testing (QNFT) must be used. When quantitative fit-testing is used, **all** full-facepiece respirators must meet or exceed a fit factor of 500, while quarter - and half-mask respirators must meet or exceed 100. For all positive pressure, atmosphere-supplying respirators, either qualitative or quantitative fit testing may be used. While atmosphere-supplying respirators are fit-tested in the negative pressure mode, these respirators are most often used as positive pressure respirators in the workplace. Positive pressure atmosphere-supplying respirators that pass the QLFT or QNFT fit test may be used at the higher protection factors assigned these respirators. See Table 1 for a summary.

1. Inspection Guidelines. The CSHO should determine which protocol was used for fit testing and if all employees who are wearing tight-fitting respirators have been fit-tested in the last twelve months for the respirator they are wearing. Fit testing procedures should be discussed with the program administrator. If fit testing is being performed, the CSHO should observe the company's procedures and evaluate their adherence to the prescribed protocol.
 - a. Where employees move from job to job within the year (e.g., temporary or construction workers), their fit test need not be repeated, if the employer obtains a copy of the original fit test record and the same respirator make, model and size is available and appropriate for use at their new work site.
2. Citation Guidelines. Fit test records should be reviewed. If no fit test record is found it must be determined if they were not maintained [(m)(2)(ii)] or the test was not performed [(f)(2)] and cited accordingly. For not following prescribed protocol, cite (f)(5). Using QLFT for negative pressure APR's used in atmospheres greater than 10 times the PEL would be cited as (f)(6).
 - a. If fit testing was done by a previous employer within the required time, but no fit test record was obtained by the current employer, a citation for (m)(2) should be issued.
 - b. If the CSHO determines the fit testing was not appropriate for the present respirator usage, citations for the appropriate requirements of paragraph (f) should be issued.

Table 1		
Acceptable Fit-Testing Methods		
	QLFT	QNFT
Half-Face, Negative Pressure, APR (<100 fit factor)	Yes	Yes
Full-Face, Negative Pressure, APR (<100 fit factor) used in atmospheres up to 10 times the PEL	Yes	Yes
Full-Face, Negative Pressure, APR (>100 fit factor)	No	Yes
PAPR	Yes	Yes
Supplied-Air Respirators (SAR), or SCBA used in Negative Pressure (Demand Mode) (>100 fit factor)	No	Yes
Supplied-Air Respirators (SAR), or SCBA used in Positive Pressure (Pressure Demand Mode)	Yes	Yes
SCBA - Structural Fire Fighting, Positive Pressure	Yes	Yes
SCBA/SAR - IDLH, Positive Pressure	Yes	Yes
Mouthbit Respirators	Fit-testing Not Required	
Loose-fitting Respirators (e.g., hoods, helmets)		

H. **Use of Respirators - 1910.134(g):** Employers must establish and implement procedures for the proper use of respirators. These procedures include prohibiting conditions that may result in facepiece leakage, preventing employees from removing respirators in hazardous environments, ensuring continued respirator operation throughout the shift, and establishing procedures for the use of respirators in IDLH atmospheres.

1. Facepiece Seal Protection (g)(1):

- a. Inspection Guidelines - The CSHO should be alert for the presence of facial hair (more than one day's growth) that comes between the sealing surface of the respirator and the face as well as other conditions that could result in facepiece seal leakage or interfere with valve function of tight-fitting respirators, such as the presence of facial scars, the wearing of jewelry, or the use of headgear that projects under the facepiece seal. Corrective glasses or goggles or other personal protective equipment (such as faceshields, protective clothing, and helmets) must not interfere with the seal of the facepiece to the face of the user. If employees wear other safety equipment with their respirators, the employee must pass an appropriate fit test while wearing the equipment to determine if it interferes with the seal.

Employees should be observed to determine if the seal check procedures are being performed each time the respirator is donned. The procedure used must be one listed in Appendix B-1 or recommended by the manufacturer if the employer demonstrates it is as effective as those listed in Appendix B-1. Alternative seal checks must be based on scientific studies. [The face fit is considered satisfactory if a slight positive pressure can be built up inside the

facepiece when the exhalation valve or surface is covered, the user exhales gently, and there is no evidence of outward leakage at the seal. The negative check requires covering the inlet opening or surface, inhaling gently, and having the facepiece remain in a slightly collapsed condition with no inward leakage of air detected.]

- b. Citation Guidelines - CSHO should cite (g)(1)(i)(A) when employees' facial hair comes between the sealing surface of the facepiece and the face or interferes with valve function; (g)(1)(i)(B) when any other condition except for those listed in (g)(1)(ii) interferes with the face-to-facepiece seal; (g)(1)(ii) when the employee is wearing equipment (e.g., glasses, goggles, helmets, etc.) that affects the face-to-facepiece seal, but was not worn during fit testing; (g)(1)(iii) if user seal checking is not being performed or the employer has not demonstrated that the procedures used are those listed in or as effective as those in Appendix B-1. This paragraph should not be cited in voluntary use situations, if overexposures are not found.

2. Continuing Respirator Effectiveness (g)(2):

- a. Inspection Guidelines - The employer is required, by paragraph (c)(1)(ix), to address in its written program the type of regular surveillance of the workplace necessary to evaluate the effectiveness of the respirator program. The surveillance procedures may include continuous or periodic monitoring, on-site observations, and notation of problems. The intensity of the surveillance should be tailored to the hazards present in the workplace. Highly hazardous substances that pose acute respiratory hazards merit a higher degree of surveillance.

Section (g)(2)(ii) requires that employers ensure that employees leave the respirator-use area to correct certain problems associated with respirator use, including the detection of contaminant breakthrough, and to replace the respirator or its filters or cartridges. Employees should be interviewed [e.g., What do you do if you notice a leak?] to determine whether there are any policies or actions which would prohibit or impede them from leaving the area should they have significant problems with their respirators or which impede the replacing of filters or cartridges. Paragraph (g)(2)(iii) is designed to prevent employees from reentering a workplace after leaving because of a significant respirator failure without first assuring the proper functioning of the respirator.

- b. Citation Guidelines - The CSHO should cite (c)(1)(ix) if the written procedures are inadequate to identify problems or changes; (g)(2)(i) if the routine surveillance of the work conditions is not performed;* the appropriate section of (g)(2)(ii)(A), (B) or (C), if prohibitions to leaving an area are identified or if employees fail to leave the area when the standard requires them to do so; (g)(2)(iii) if employees are allowed back into an area before the employer has replaced or repaired the respirator.

3. Procedures for IDLH Atmospheres (g)(3):

- a. Inspection Guidelines - The employer must be prepared for emergency rescue or respirator failure whenever employee(s) are working inside of an IDLH atmosphere. At least one person must be on standby outside the IDLH atmosphere and maintain communication with the person inside at all times. The standby person(s) must be trained and equipped to provide an effective emergency rescue. Except in emergency situations, environments containing IDLH atmospheres are frequently well enough characterized and controlled that a single standby person can monitor the status of multiple entrants. The need for multiple standbys should be evaluated in context with the ability of the standby personnel to meet all their standby duties, including their ability to monitor the worker(s) in the area and their ability to initiate effective rescue procedures. Planning is critical for effective response to emergency situations through the development of specific emergency procedures. These procedures should address how the employer will be notified when standby person(s) outside of the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue and what actions will be taken or assistance provided by the employer. Emergency procedures must be developed and included in the employer's written respirator program.

For work performed outside of visual contact, voice, radio or signal line are permitted. CSHOs should specifically review protocols for communication, rescue, and notification for employees entering IDLH atmospheres. Communication protocols must be established that allow the standby person to monitor entrant status and enable the standby(s) to alert entrants of the need to evacuate the area. It is not sufficient to rely on the employees in the IDLH area to call for help when needed.

Paragraph (g)(3) does not apply to IDLH atmospheres in a permit-required confined space (PRCS) or to environments in which there is an uncontrolled release of a hazardous substance. IDLH atmospheres in a PRCS are specifically addressed in the PRCS standard, 1910.146, and its accompanying directive, CPL 2.100. Environments in which there is an emergency release of a hazardous substance are addressed in paragraph (q) of OSHA's HAZWOPER standard, 1910.120 or 1926.65, and its accompanying directive, CPL 2-2.59A. In facilities where an uncontrolled release of a hazardous substance could create an emergency IDLH atmosphere, employers must follow the requirements of HAZWOPER paragraph (q). These situations must be addressed in the employer's emergency response plan and the response procedures must be consistent with that standard.

- b. Citation Guidelines - If an IDLH area meets the definition of a confined space, then the requirements of 1910.146 would apply and

the appropriate section of 1910.146 should be cited where deficiencies are noted. If the IDLH is a result of an uncontrolled release of a hazardous substance, then the appropriate section of the HAZWOPER standard, 1910.120 should be cited. Otherwise, violations should be cited under the applicable subparagraph of (g)(3). If adequate communication is not maintained between the entrants and the standby personnel located outside the IDLH area, (g)(3)(ii) should be cited.

4. Procedures for Interior Structural Firefighting, 1910.134(g)(4): This section applies to private sector workers engaged in firefighting, including those working in industrial fire brigades and private incorporated fire companies, and to Federal employees under Section 19 of the Act. These or equivalent provisions apply to State and local government firefighters only in the 25 States that operate OSHA-approved State plans which are required to adopt an identical or "at least as effective" standard and extend its coverage to public employees. (Coverage of volunteer firefighters in these States varies by State and depends on State law.) The following guidance will have applicability primarily in the State Plan States and in responding to general inquiries.

The provision is limited to workers performing an interior attack on an interior structural fire. In Subpart L (1910.155), OSHA has defined "interior structural fire fighting" to mean: "the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are beyond the incipient stage." This is firefighting to control or extinguish a fire in an advanced stage of burning, producing large amounts of smoke, heat and toxic products of combustion. Firefighter exposure during this activity is extremely hazardous. The atmosphere is considered IDLH and the use of Self Contained Breathing Apparatus is required. By contrast, incipient stage fire fighting involves the control or extinguishment of a fire in the initial or beginning stage, using portable fire extinguishers or small hose lines without the need for personal protective equipment. It is the incident commander's responsibility, based on training and experience, to judge whether a fire is an interior structural fire, and how it will be attacked.

OSHA has discussed this provision in a number of documents.

- a. Summarized below are some key points from those documents.

- There must always be at least two firefighters stationed outside during interior structural firefighting, and they must be trained, equipped and prepared to enter if necessary to rescue the firefighters inside. However, the incident commander has the responsibility and flexibility to determine when more than two outside firefighters are necessary given the circumstances of the fire. The two-in/two-out rule does not require an arithmetic progression for every firefighter inside, i.e. the rule should not be interpreted as 4-in-4-out, 8-in-8-out, etc.

- It is important that the CSHO recognize that life-saving

activities in interior structural fire fighting are not precluded by the standard. There is an explicit exemption in the standard that if life is in jeopardy, firefighters have the discretion to perform the rescue, and the "two-in/two-out" requirement is waived. There is no violation of the standard under such life-saving rescue circumstances.

- The two-in/two-out provision is not intended as a staffing requirement. It does not require fire departments to hire additional firefighters; it does not require four-person fire companies; it does not require four persons on a fire truck. Most fire departments have more than four firefighters and can assemble the numbers required on the scene by waiting for others to arrive. During this time the fire may be attacked only from the outside, sizing-up operations may occur, and emergency rescue necessary to save lives may take place as discussed above. The "two-in/two-out" rule is a worker safety practice requirement, not a staffing requirement.
- The standard allows one of the standby firefighters to have other duties such as serving as the incident commander, safety officer, or operator of fire apparatus. However, one of the outside firefighters must actively monitor the status of the inside firefighters and may not be assigned additional duties. The second outside firefighter may be involved in a wide variety of activities. Both of the outside personnel must be able to provide support and assistance to the two interior firefighters; any assignment of additional duties for one of the outside firefighters must be weighed against the potential for interference with this requirement. Proper assignment of firefighting activities at an interior structural fire must be determined on a case-by-case basis and is dependent on the existing firefighting situation. Compliance will always depend on consideration of all the worksite variables and conditions, and the judgement of the incident commander is critical in meeting this performance standard.
- The two firefighters (buddies) entering an IDLH atmosphere to perform interior structural firefighting must maintain visual or voice communication at all times. Electronic methods of communication such as the use of radios shall not be substituted for direct visual contact between the team members in the danger area. However, reliable electronic communication devices are not prohibited and certainly have value in augmenting communication and may be used to communicate between inside team members and outside standby personnel.
- For further explanation refer to the preamble of the Respiratory Protection standard (vol. 63, No. 5, 1245-1248) and the Respirator Question and Answer document (August 3, 1998). Both documents can be found at OSHA's Homepage -

- b. Inspection Guidelines - Section (g)(4) includes the requirements of (g)(3). The first and critical step in evaluating an employers response using the two-in/two-out rule is to determine if there was interior structural fire fighting activity. This determination will require consideration of the factors existing at the time of the firefighting action and the basis for the Incident Commander's finding. CSHO should seek expert opinion from other authorities such as a state or local fire Marshall or other fire protection professionals and should thoroughly interview affected personnel to document the violation.
- c. Citation Guidelines - If the CSHO's investigation reveals that the two-in/two-out rule was not followed during the interior attack of an interior structural fire and there was no reasonable expectation that someone was in jeopardy inside the building, the CSHO should cite (g)(4)(i) or (g)(4)(ii) as a serious violation. If adequate communication is not maintained between the team inside and the standby personnel located outside the IDLH, (g)(3)(ii) should be cited.

I. Maintenance and Care of Respirators - 1910.134 (h)(1): Respirators must be cleaned and disinfected as often as necessary to keep them in a sanitary condition. They must be properly stored to prevent damage and contamination, inspected regularly and repaired as necessary.

- 1. Inspection Guidelines. To ensure that respirators are clean and in good working order, the employer can have respirators cleaned and repaired in a centralized operation where respirators are passed out to employees OR the employer may require the respirator user to perform all cleaning and respirator maintenance functions. The CSHO should verify that the procedures in the mandatory Appendix B-2 or an equivalent method specified by the manufacturer are being followed and are performed by employees who are adequately trained in the proper respirator care procedures. Respirators issued to more than one employee must be cleaned and disinfected before being worn by another user. The use of individually-wrapped cleaning towelettes may be used as an interim method in the cleaning schedule for individually assigned respirators, but they must not be the only method in place. During fit-testing, towelettes may also be used between employees being tested, however these respirators must be thoroughly cleaned at the end of each day, using the procedures in Appendix B-2.

The employer must ensure that respirators are inspected before each use and during cleaning. The CSHO should observe the condition of the respirators being used in the workplace. One or more respirators should be checked before employees enter, or as they leave the respirator area. A minimally acceptable inspection procedure for ALL respirators includes a check of respirator function, tightness of connections and the condition of the various parts, including but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters, or filters, and a check of

the respirator's elastomer parts for pliability and signs of deterioration.

SCBA's also require an inspection of the air and oxygen cylinders to assure that the cylinder pressure is maintained at 90% of the manufacturer's recommended pressure level and that the regulator and low pressure warning devices function properly. To assure that both the regulator and low pressure warning devices function properly the warning device must be activated and heard by the person performing the inspection. The CSHO should interview the individual who is inspecting SCBA's to determine if these regulator and low pressure warning devices are being activated according to the respirator manufacturer's instructions.

The CSHO should also observe how respirators are stored in the workplace. Respirators must be properly stored to protect them against physical damage, contamination, excessive moisture, extreme temperatures, sunlight, and damaging chemicals. Emergency use respirators must be stored in compartments OR in covers, both of which must be clearly marked as containing the emergency respirators.

2. Respirators That Are Available for Emergency Use: An inspection must be conducted monthly for all emergency use respirators. The employer must certify in writing that an inspection was performed. The certification must include the name (or signature) of the person who made the inspection, the findings of the inspection, any remedial action, and a serial number or other means of identifying the inspected respirator. The respirator must also be checked before and after each use.
 - a. Emergency escape-only respirators carried by employees must be inspected before being taken into the workplace for potential use.
3. Section (h)(4) Repairs: Defective respirators must be removed from service. A respirator is defective if one or more of its components is missing, damaged, or visibly deteriorated. The employer must develop some means to ensure defective respirators are not used in the workplace. The employer can comply by placing an "out of service" tag on the respirator to help ensure that the defective respirator is not inadvertently used or by removing the respirator from the work area. An "appropriately trained" person must be responsible for performing repairs or adjustments to respirators.
4. Inspection Guidelines. The CSHO must interview the employee(s) at the worksite who repair respirators, and determine what training they have received. An appropriately trained person is an individual who has received training from the manufacturer or otherwise has demonstrated that he or she has the skills to return the respirator to its original state of effectiveness. The training is performance-oriented, so it is acceptable for the employee to have acquired the skills through practice rather than by attending a formal training course. Repairs to reducing and admission valves, regulators, and alarms must be done by a technician trained by the manufacturer.
 - a. Only the respirator manufacturer's NIOSH-approved parts that are

designed for the particular respirator being repaired can be used to repair a respirator.

- b. CSHOs should cite for defective respirators not effectively being removed from service.

J. **Breathing Air Quality and Use 1910.134 (i)**: Compressed breathing air must meet at least the requirements for Grade D breathing air. The ANSI/CGA G.7-1 - 1989 specifies the contents of Grade D breathing air as: oxygen (volume/volume) of 19.5 to 23.5 %; hydrocarbon (condensed) of 5 mg/m³ of air or less; carbon monoxide of 10 ppm or less; carbon dioxide of 1,000 ppm or less; and the lack of a noticeable odor.

1. **Inspection Guidelines**. If compressors are used to supply breathing air, the CSHO should note the location of the compressor intake and ensure it is located in an area uncontaminated by either combustion exhaust gases produced by vehicles or the compressor itself (if applicable), or by other exhaust gases ventilated from plant processes. A tag containing the signature of the person authorized by the employer to change the in-line sorbent beds and filters and the date of the latest change must be maintained at the compressor.

For air compressors that are **not** oil lubricated, a CO alarm is not required. However, the employer is required to ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm. Some practical methods for ensuring that the carbon monoxide level does not exceed 10 ppm include; placing the air intake for the compressor in an area that the employer knows is free from contaminants; frequent or continuous monitoring of the breathing air supply; the use of carbon monoxide filters; or the use of a high temperature alarm or shut off devices.

If the employer is using an oil-lubricated air compressor, it must have either a carbon monoxide alarm, high temperature alarm, or both. If only a high temperature alarm is used, then the breathing air must be tested for the presence of carbon monoxide at intervals sufficient to ensure that carbon monoxide levels do not exceed 10 ppm. The alarm must be able to alert the users or another employee who knows to alert any respirator users.

If cylinders are used they must be marked with a NIOSH approval label. Cylinders of purchased breathing air must have a certificate of analysis from the supplier that the breathing air meets the required Grade D air and moisture content.

If compressed or liquid oxygen is used, it must meet the specifications for breathing oxygen outlined by the United States Pharmacopoeia (USP). Compressed oxygen must not be used for any respirators that previously used compressed air.

All breathing air couplings must be incompatible with those of non-respirable air or other gases used at the site to prevent inadvertent servicing of air line respirators with non-respirable gases or oxygen.

K. **Identification of Filters, Cartridges, and Canisters 1910.134 (j):** The employer must ensure that all canisters and filters are properly labeled and color coded with the NIOSH approval label and that the label is not removed, obscured, or defaced while in service. This requirement enables the employee using the respirator to check and confirm that the respirator has the appropriate filters before the respirator is used and also allows fellow employees, supervisors, and the respirator program administrator to readily determine that the employee is using the appropriate filters.

1. **Inspection Guidelines.** The CSHO should verify that properly labeled filters and canisters are being used, and that the labels remain legible.
2. **Citation Guidelines.** Date and time labels applied to the filters/cartridges should not be considered violations, but the employer must obscure as little as possible of the label to allow ready identification.

L. **Training and Information 1910.134 (k):** The employer is required to provide effective training to employees who wear respirators. Training must be provided prior to an employee's use of a respirator in the workplace and must be comprehensive and understandable. Training must recur annually, and more often if retraining appears necessary to ensure safe use. The employer must ensure that each employee can demonstrate a knowledge of all items in (k)(1)(i) thru (vii). Pre-testing may be used as a training aid to determine extent of retraining required.

1. **Inspection Guidelines.** The effectiveness of the training program can be evaluated by determining how well employees understand how to use their respirators. If respirators are improperly worn, missing parts, dirty, improperly stored, or the wrong cartridges are being used, the compliance officer should interview the employee for knowledge of the respirator requirements.

Employees should be interviewed to determine if they have received the required training and the extent of that training. If the CSHO detects a trend in employee responses that indicate training is not being conducted, or is conducted in a cursory manner, a closer review of the training program is necessary.

Employees who voluntarily wear respirators must, at least, be given the information in Appendix D.

2. **Citation Guidelines.** Lack of training should be cited. Citations for insufficient training should usually be based on several interviews that reveal a lack of understanding of the respirator program. Lack of knowledge about the hazards for which the respirator is being used, could also indicate a deficiency in the employer's Hazard Communication training [1910.1200(h)].

M. **Program Evaluation 1910.134(l):** The employer must conduct evaluations of the workplace to ensure the written respiratory protection program is properly implemented. The employer must observe and consult employees to determine if

they have any problems with the program and ensure that the respirators are used properly.

1. Inspection Guidelines. The CSHO should evaluate how well the written respiratory program is being implemented in the workplace. Observed deficiencies in the program and evaluation procedures should be discussed with the program administrator to determine what previous efforts she or he may have made to evaluate how well their program was working. Deficiencies should also be discussed with employees to determine how long any deficiency has existed and what requests or complaints about the respirator program if any they have made to the program administrator. If the program administrator keeps a written assessment, implemented changes may be considered as efforts toward improvement. Recent changes in the workplace such as new processes should have been evaluated for necessary respiratory program changes.
2. Citation Guidelines. Multiple deficiencies found during the inspection, especially long term deficiencies, could indicate inadequate program evaluation.

N. Recordkeeping - 1910.134(m): For every employee required to wear a respirator, the employer must establish and retain medical evaluations and fit-testing records. Medical evaluation records must also be retained for employees who wear elastomeric facepiece respirators. An employee's medical evaluation records must be made available to the employee and to OSHA in accordance with 1910.1020. The employer must also make an employee's fit-testing records available to that employee and to OSHA. The standard does not intend for the employer to make an employee's medical or fit-testing records available to any other individual unless that individual is the employee's "designated representative" as defined in 1910.1020(c)(3).

1. Inspection Guidelines. Even though the employer must ensure the medical evaluations are maintained, the actual medical evaluations will normally be maintained with the PLHCP, not the employer. Alternatively, the company nurse or doctor may maintain these files, but only medical confidentiality is maintained. The employer must retain a record of the medical evaluation which includes the PLHCP's written recommendation. If an employee states she or he has not had a medical evaluation, the CSHO should check if a medical evaluation record is on file.

Fit test records must be kept until the next fit test is administered. Each fit test record must contain the employee identification, type of fit test, date last tested, the results of the test, and the make, model and size of the respirator tested. The CSHO should review these records to verify that fit-testing is being done annually and confirm that the fit-tested respirators are the same models and sizes as those observed in the workplace.

The CSHO should also check on the availability of the written program.

2. Citation Guidelines. If a medical evaluation record cannot be found, it must be determined whether the record was not maintained or the evaluation was not performed. If not maintained, (m)(1) would normally

be cited. If no record can be found and the employee confirms an evaluation was not performed, then (e)(1) would be cited.

Lack of a fit test record or lack of information on a fit test record would be cited under (m)(2). If an employee is wearing a respirator different from that found in his fit test records then (f)(2) should be cited. Improper fit testing procedures would similarly be cited under the appropriate subparagraph in (f).

- O. **Dates 1910.134 (n):** The final standard became effective April 8, 1998. By September 8, 1998, the employer must have evaluated the workplace to determine if respirator use is required. Compliance with all provisions is required no later than October 5, 1998.

- P. **Appendices:** All appendices are mandatory.

1. Appendix A details fit testing protocols [see paragraph (f)(5)].
2. Appendix B-1 details User Seal Check Procedures [see paragraph g(1)(iii)].
3. Appendix B-2 details Respirator Cleaning Procedures [see paragraph (h)(1)].
4. Appendix C is the OSHA Respirator Medical Evaluation Questionnaire [see paragraph (e)(2)].
5. Appendix D is Information for Employees Using Respirators When Not Required Under the Standard. This appendix must be provided to all employees who voluntarily use respirators. [see paragraph (c)(2), (k)(6)]

VIII. **Interface with Other Standards.**

- A. **PEL Overexposures.** Overexposures to Permissible Exposure Limits will usually be linked to compliance with the respirator standard. Most of these PEL's are listed in Tables Z1- Z3 in 1910.1000 and Appendix A in 1926.55.
- B. **Standards Regulating Toxic Substance Exposure.** A number of industry-specific standards and substance-specific standards regulating exposure to toxic substances have been affected by the new respirator revisions. Many paragraphs from these standards that addressed respirator use, selection, and fit testing were deleted and now refer to the provisions in 1910.134. Violations will now be cited under the appropriate paragraphs of 1910.134.
- C. **Medical Records Access.** The Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020) requires that employees have access to all medical and exposure records generated under this standard.

- IX. **Classification and Grouping of Violations.** The procedures in chapter III of the Field Inspection Reference Manual (FIRM) should be followed. The FIRM describes the circumstances, such as proposing Willful or Criminal violations, where the CSHO or AD may need to consult the Region or the Solicitor's office. The Citation Policy for Paperwork and Written Program Requirement Violations, CPL 2.111 , should be reviewed for guidance when citing the written program.

- X. **Authorization to Review Limited Medical Information.** Appropriately qualified

compliance personnel are authorized to review medical records and medical opinions pertinent to compliance with the Respiratory Protection Standard. There are four directives that address the limitations and procedures which are to be followed. They are OSHA Instruction(s) CPL 2-2.30 (Authorization to Review Medical Opinions); CPL 2-2.32 (Access to Biological Monitoring Results); CPL 2-2.33 (Written Access Orders); and CPL 2-2.46 (Authorization to Review Specific Medical Records). In general, each of these instructions defines "qualified compliance personnel" as a field-qualified Industrial Hygienist who is at the journeyman level or a professional with specific training or experience in medical disciplines. When inspections are conducted by teams, the Team leader should ensure that a team member is so qualified.

XI. Training for OSHA Personnel.

- A. CSHO Experience. For all inspections on a site where respirators are used and the exposures are expected to be above the 8-hour TWA or the STEL, only experienced and properly trained CSHOs shall perform the on-site evaluations. CSHOs are expected to be knowledgeable of the:

1. Potential hazards which may be encountered at the site,
2. Contents of the Respiratory Protection standard,
3. Appropriate PPE to be worn. Each CSHO who will be expected to use PPE must be trained in the proper care, use, and limitations of the PPE.

Instructions for the use of respiratory protection by CSHO's are contained in OSHA Instruction CPL 2-2.54. The CSHO should closely review and examine all the data available on site concerning the exposures or potential exposures in this particular location. If the employer cannot supply adequate data to support the selection of the types of respirators that are in use, the CSHO must not enter the areas where respirators are in use. If the hazard determination performed by the employer has been completed in accordance with the standard, the CSHO must don the appropriate respirator required in that work-site prior to the walkaround in areas where respirators are required.

- B. Emergency Procedures. For all inspections on a site where OSHA personnel are investigating an emergency that involves hazardous substances, the CSHO must be knowledgeable of:

1. Appropriate training required by 29 CFR 1910.120, or any applicable annual refresher training;
2. The ARA for Technical Support must be consulted for assistance in determining the appropriateness of SCBA use by CSHOs.

XII. Medical Examinations for OSHA Personnel.

- A. Regional Administrators and Area Directors are responsible for implementing the CSHO Medical Examination program in accordance with OSHA Instruction, PER 8-2.5. This medical evaluation is more stringent than what is required by the revised Respiratory Protection Standard.

- B. Many of the hazards that CSHO's may encounter are already regulated by the

medical surveillance requirements in other OSHA standards. CSHOs who are required to wear any respiratory protection and Level A or B PPE must be medically cleared via the CSHO Physical Examination procedures.

XIII. Protection of OSHA Personnel. The paramount concern addressed in this section is the protection of the CSHO. Compliance Officers are reminded about Agency policy that requires that appropriate personal protective equipment be used when exposed to a hazard. When and if a CSHO is not adequately protected by the use of appropriate PPE, the CSHO should stay out of the contaminated area to avoid being overexposed to any hazardous substance.

A. Personal Protective Equipment (PPE).

1. Regional Administrators and Area Directors must ensure that appropriate PPE is available for the CSHO.
 - a. Respirators must be selected in accordance with 1910.134.
 - b. Eye and face protection must meet the requirements of 29 CFR 1910.133.

APPENDIX A.

CHANGE SCHEDULES GUIDE - A LISTING OF METHODS

A brief description of some currently available approaches or methods for respirator cartridge change schedules is presented below. The CSHO should assess the "Good Faith" efforts of the employer on a case by case basis and contact appropriate regional OR National office staff for guidance, as necessary. This is not intended to be an exhaustive list, but a summary of some reasonable methods that an employer may take in creating a change schedule. No matter which method is used, the employer must maintain any data used in making their decision as part of their program.

Manufacturers Objective Data: Respirator cartridge model-specific objective data that is available from the manufacturer or through a distributor may be used to establish change schedules. Objective data may be presented in tabular or graphical format or simply provided verbally over a manufacturer's telephone help line. Some manufacturers have developed elaborate computer programs available on the Internet that provide the necessary objective data to the user.

Experimental Methods: Experimental breakthrough-time data from a laboratory based on worst case testing of simulated workplace conditions. This method can provide fairly accurate service life data compared to other available methods.

Mathematical Predictive Modeling: One tool that has demonstrated value is the use of mathematical modeling based on predictive equations. These models are typically complex

and require considerable expertise to apply. They also require some proprietary information from the respirator manufacturer. OSHA fully supports the further development and validation of these models. The agency believes that respirator manufacturers may be in the best position to apply them to their products.

Analogous Chemical Structures: Employer would rely on service life values from other chemicals having analogous chemical structure to the contaminant under evaluation for breakthrough. Or in some cases a chemical with known migration may reasonably be anticipated to act as a surrogate for a similar chemical that would have less rapid migration (e.g., an employer could assume that a heavier, less volatile compound than another in the same chemical series that had been tested for breakthrough would breakthrough no faster than the latter compound, such as benzene versus toluene.) The use of this method requires a substantial amount of judgement and assumption of similar chemical properties. The use of analogous chemical structures should be infallible as long as objective data or information for lower molecular weight compounds is used to predict the breakthrough times for higher molecular weight analogues containing only additional methyl or phenyl groups. Data from higher molecular weight groups should not be used to predict the behavior of analogous substances with lower molecular weight. This approach relies heavily on experimental data and expert analysis. This method may be less accurate than others and should be used only when better information is not available.

Workplace Simulations: Unvalidated methods exist or are under development where the respirator cartridge is tested in the workplace in "real time" and under actual conditions of use. Simple designs have been informally described to the agency. Workplace air during representative conditions is drawn over the cartridge at a rate approximating normal breathing at a higher work rate. An air sampling/analytic device would be placed on the other side of the filter to measure the time of breakthrough. Employers could incorporate this type of testing into their air monitoring program using sampling strategies established in their workplace. In theory, these approaches should be an accurate method for determining change schedules and could accommodate fluctuating conditions of humidity, concentration, etc., to allow less conservative schedules that utilize a larger fraction of the true service life.

Rules of Thumb: Generalized rules or guidance can be generated from experimental work. Presented below is a rule of thumb for estimating organic vapor service life found in Chapter 36 of the American Industrial Hygiene Association publication

"The Occupational Environment Evaluation and Control".

*If a chemical's boiling point is $>70^{\circ}\text{C}$ and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.

Note: This first rule of thumb needs further review.

* Service life is inversely proportional to work rate.

* Reducing concentration by a factor of ten will increase service life by a factor of five.

* Humidity above 85% will reduce service life by 50%.

These generalizations should only be used in concert with one of the other methods of predicting service life for specific contaminants.

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Occupational Safety & Health Administration
U.S. Department of Labor



News Release

Thursday, September 24, 1998

Contact: Frank Kane (202) 219-8151

OSHA ISSUES DIRECTIVE THAT WILL HELP EMPLOYERS MEET NEW RESPIRATORY PROTECTION STANDARD

If you are an employer covered by the Occupational Safety and Health Administration's (OSHA) new respiratory protection standard, the agency has new information to help you.

OSHA's new enforcement directive to agency field personnel will also be useful to employers in meeting requirements of the standard, including the "two-in/two-out" provisions for firefighters' safety. The standard was published Jan. 8, 1998, and employers must be in compliance by Oct. 5, 1998.

Assistant Secretary of Labor for Occupational Safety and Health Charles N. Jeffress said, "This standard significantly improves worker protection. In addition to saving lives and preventing injuries and illnesses, employers will save up to \$94 million a year on injury and illness-related costs."

The new standard applies to all respirator use in general industry, shipyards, marine terminals, longshoring, and construction workplaces. It does not apply to agricultural operations or to occupational exposure to tuberculosis.

The use of respirators to protect against tuberculosis will continue to be enforced under the old standard, which will be redesignated 1910.139 on Oct. 5, 1998, and will apply only to tuberculosis until OSHA issues a final standard for occupational exposure to TB, which will contain TB respiratory protection provisions. Hearings have been held on the proposed TB standard in Los Angeles, Chicago, New York City, and Washington, D.C., and the testimony and comments are now being reviewed.

The new standard (1910.134) applies to respirators worn to protect employees from exposure to air contaminants above a specified exposure limit or otherwise necessary to protect employee health. It also covers situations where respirators are otherwise required to be worn by the employer, and where respirators are voluntarily worn by employees for comfort or other reasons.

The standard restates OSHA's longstanding policy that engineering and work practice controls should be the primary means to reduce employee exposure to toxic chemicals and that respirators should only be used if engineering or work practice controls are infeasible or while they are being put in place.

Among other things, the compliance directive (CPL 2-0.120) discusses definitions of terms used in the standard; requirements for a written respiratory protection program and respiratory protection program administrator; voluntary use of respirators; selection of respirators and hazard evaluation; the requirements for employers to develop chemical cartridge change schedules for the respirators worn in their workplaces; medical evaluation of an employee's fitness to wear a respirator; and fit testing for employees using negative or positive pressure tight-fitting respirators.

Also discussed are the proper use of respirators; employees working in conditions Immediately Dangerous to Life or Health (IDLH); and firefighters engaged in interior structural firefighting, i.e., "two-in/two-out" requirements.

The "two-in/two-out" firefighting procedures apply to private sector workers engaged in firefighting, including those working in industrial fire brigades and private incorporated fire companies, and to federal firefighters. These or equivalent provisions apply to state or local government firefighters only in the 25 states and territories that cover public employees under OSHA-approved state plans. These states are required to adopt an identical or "at least as effective" standard and extend its coverage to public employees. Coverage of volunteer firefighters in these states varies by state and depends on state law.

The directive also notes that at least two firefighters must be stationed outside during interior

structural firefighting and they must be trained, equipped and prepared to enter if necessary to rescue firefighters inside. The incident commander has the responsibility and flexibility to determine when more than two outside firefighters are necessary.

The two firefighters (buddies) entering an IDLH atmosphere to perform interior structural firefighting must maintain visual or voice communication at all times. Electronic means of communication such as radios cannot be substituted for direct visual contact between the team members in the danger area. However, they can be used to communicate between the inside team members and outside standby personnel.

Life-saving activities in interior firefighting are not precluded by the standard. There is an explicit exemption in the standard that if life is in jeopardy, firefighters can perform the rescue without following the "two-in/two-out" requirement.

OSHA notes that the "two-in/two-out" provision is not intended as a staffing requirement, but is a requirement for worker safety in fighting interior structural fires.

The directive also discusses maintenance and care of respirators; training and information; evaluation of the effectiveness of the respirator program; recordkeeping; and how the respirator standard is linked to other OSHA standards.

The directive is effective Friday, Sept. 25, 1998.

The directive can be accessed through the OSHA Home Page on the Internet World Wide Web (<http://www.osha.gov>) under "Library/Reading Room" and then "Directives." A supplementary document, "Questions and Answers on the Respiratory Protection Standard," also can be accessed through the OSHA Home Page.

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